

GOVERNMENT OF INDIA
MINISTRY OF COMMERCE AND INDUSTRY



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REPORT
OF THE
INDIAN TARIFF BOARD
ON THE
FAIR RETENTION PRICES OF STEEL

Produced by
THE TATA IRON & STEEL COMPANY
and
THE STEEL CORPORATION OF BENGAL

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GOVERNMENT OF INDIA
MINISTRY OF COMMERCE & INDUSTRY

RESOLUTION
(Tariffs)

New Delhi, the 22nd June, 1951.

No. SC(A)-2(68)/51. In their Resolution No. 3-T(4)/50, dated the 9th December 1950 in the late Ministry of Commerce, the Government of India, requested the Tariff Board to examine and recommend whether any revision of the ex-works retention prices of steel produced by the Tata Iron & Steel Co. and the Steel Corporation of Bengal, was called for for the year 1950. In conducting the inquiry, the Tariff Board was asked to pay special attention to the reasons for increases in cost, if any, and the extent to which these reasons applied equally to both Producers. The Board was also requested to recommend the future ex-works retention prices of steel for 1951 and subsequent years. To assist the Board to assess the effect of technical and managerial efficiency on costs of production, Government obtained the services of Mr. Peter V. Martin of Koppers as Technical Adviser. The Board, having conducted its inquiry, has submitted its report. Its main conclusions and recommendations are as follows:-

- (1) The works costs of both the Producers had increased in 1950 over the estimates made by the Tariff Board in 1948 on which the current retention prices are based owing to three main factors, namely,
 - (a) increases in the prices of raw materials, stores and labour,
 - (b) variations in the use of materials, stores, labour, etc., and
 - (c) variations in the volume of output.Of these three factors, while factor (a) is largely beyond the control of the manufacturers, factors (b) and (c) are almost entirely within their control.
- (2) The Board has made a detailed analysis and examination of the works costs of both the Companies for the year 1950. It has also made an assessment of costs for the first half of 1951, as new retention prices are not likely to come into force until the 1st of July 1951. Taking all factors into account, the Board has estimated that an increase of Rs. 11 per ton in the case of both of Tatas and SCOB was due to causes beyond the control of the management and that both the Companies should be paid that sum.
- (3) To enable the Companies to carry out their production plans without frequent interruptions, retention prices should be fixed for a period of three years, provided that if significant increases take place in future in the prices of raw materials and stores, freight rates and/or compulsory charges under any labour welfare schemes initiated by the State, Government should examine the position and, if necessary, revise the retention prices.
- (4) Having regard to the fact that uniform retention prices of steel have been fixed since the commencement of control over steel prices and also in view

of the fact that the estimated fair ex-works retention prices are equal in respect of most items of steel which are common to both the Companies, the system of uniform retention prices should continue.

- (5) In estimating the works costs for the period 1951-52 to 1953-54, the Steel Corporation of Bengal's production has been taken at 311,454 tons of saleable steel a year and the Tata Iron & Steel Co.'s production at 780,000 tons.
- (6) The attainment of the estimated production by the Steel Corporation of Bengal would entail a number of changes both at the Indian Iron & Steel Co. and the Steel Corporation of Bengal, some of the important ones being, (a) operational integration of IISCO's Hirapur Works and SCOB's steel works, (b) strengthening of the higher supervisory staff at SCOB, (c) provision for supplementary fuel supply for the open hearth furnaces, and (d) reduction of the loss in production time by 20% at the Steel Melting Shop due to repairs and rebuilding.
- (7) (i) In determining overheads for the two Companies the same principles as had been adopted in the previous report have more or less been followed except in regard to depreciation. In the case of Tatas, a net amount of Rs. 300 lakhs for depreciation, which is about Rs. 100 lakhs above the amount allowed under the Income-Tax Act, has been recommended. Similarly, in the case of SCOB, a net amount of Rs. 54.48 lakhs, which is approximately Rs. 14.48 lakhs above the amount allowed under the Income-Tax Act, has been recommended. The object of increasing the provision is, in the case of Tatas, to enable the Company to carry out all replacements and improvements which are considered to be essential for maintaining the Company's plant facilities above the optimum level and for stabilising production at about 780,000 tons a year. In the case of SCOB, the provision would enable the Company to meet expenditure on small improvements and balancing of plant so as to ensure that production is maintained at the level fixed by the Board.
- (ii) If the Board's recommendation in respect of extra depreciation is accepted by Government, the Companies should be made to set apart a net amount of Rs. 300 lakhs in the case of Tatas and Rs. 54.48 lakhs in the case of SCOB, for depreciation.
- (iii) The extra amount of depreciation should not be taken into account by Tatas for purposes of determining profit-sharing bonus under the scheme now in force.
- (8) There is no case for allowing a higher rate of return, than 8% on the gross block of the Companies.
- (9) The Companies should be compensated out of the Equalisation Fund for excess expenditure on account of any increase in the price of spelter above Rs. 3,500 per ton, which they may have to incur in obtaining supplies of the article. Conversely, if the price of spelter falls below Rs. 3,500 per ton, the difference on this account should be refunded by the Companies to the Equalisation Fund.
- (10) The payment for defectives and cuttings should be made to the Companies on the basis of the actual production of such defectives and cuttings, as categorised by the Board.
- (11) On the above basis, higher retention prices, which, on the average, works out to about Rs. 35 per ton more than the present retention prices, should be fixed for the period 1951-52 to 1953-54.

(12) The Railway Board should explore the possibility of supplying the special type of wagons as required by the Steel Companies.

(13) A small Expert Committee should be appointed to carry out a study of the costs of manufacturing special grades of steel and, based on the recommendations of such a Committee, new schedules of extra charges for special products manufactured by the Companies should be established.

2. The Government of India have accepted all the recommendations of the Board except in two respects, one of which raises an important fundamental issue and the other is a minor one. In working out the overhead charges, the Board has allowed to the Tata Iron & Steel Co., Rs. 23 lakhs representing the additional profit-sharing bonus which the Company incurred during the year 1949-50 over and above the Rs. 55 lakhs taken into account by the Board in its 1949 report in calculating the return on block. As Government are still considering the general question of profit-sharing they find it difficult to agree, at this stage, to the recommendation of the Tariff Board on this matter. They have, therefore, decided that this amount should be distributed equally between the different categories of steel produced by the Company by making a uniform reduction in the retention prices recommended by the Board, but that on the principle of one price for both the Companies, Tatas should get the same retention price as SCOB in respect of the six categories, the ex-works costs of which is the same in both cases.

The other recommendation of the Board, which Government have not accepted is that, in recommending a uniform retention price for both the Producers, the Board has, in respect of three of the nine categories which are produced by both the Companies, namely, Structurals, Light Rails and Galvanized Corrugated Iron Sheets, suggested that for Structurals, the higher ex-works cost of Tatas should be paid, but that in respect of the other two categories the ex-works costs of which are also higher in Tatas than in SCOB, only the average of the prices of both the Companies should be given. Government consider that it would be more logical and in consonance with their general policy if in respect of these three categories the higher retention prices worked out for Tatas, as reduced on account of the disallowance of the additional profit-sharing bonus, were treated as the uniform retention prices for both.

As a result of the above decisions, the overall average increase payable to the Companies works out to Rs. 33 per ton. The increased retention prices will take effect from the 1st July 1951 and will remain in force for a period of three years.

The Government of India have noted with satisfaction that the Tariff Board's estimate of production for the coming years are nearly 100,000 tons a year more than the present production. The estimates are based on actual performance - in the case of Tatas, they are based on their production for 1950 and the earlier part of this year, and in the case of SCOB on the rate of production since

March this year - and can reasonably be expected to be achieved. The increased rate of production in SCOB is due to the management having already started taking steps in the direction of the suggestions made by the Board, and Government have every reason to hope that SCOB would fully implement the Board's advice and not only reach the target estimated by the Board but would do its best to improve upon it. Government are glad that Tatas were able to produce to their maximum capacity and hope that they will maintain it in the subsequent years.

The Government of India wish to make it clear that the price increases now being granted are subject to the condition that the extra depreciation allowed to the two Companies, namely, Rs. 100 lakhs net in the case of Tatas, and Rs. 14.48 lakhs net in the case of SCOB, are actually set aside for depreciation and used by the Companies for implementing programmes of renewals, replacements and extensions of plant and works, and that no part of it will be utilised in or towards the payment of any dividends or in the distribution of profit-sharing bonus to employees or for distribution of profits.

3. The Tariff Board has produced a valuable report, in which the problems of capacity, productive efficiency and planning of the two Main Producers of steel have been analysed very carefully and expressed with great lucidity. The Government of India wish to place on record their high appreciation of the work done by the Tariff Board and the Technical Adviser.

4. The Government of India have decided that the current statutory selling prices, except for Galvanized Sheets, Galvanized Wire, and Tinplates, will, for the time being, continue unchanged. As regards the excepted categories, on account of the increased costs of spelter and tin, which have risen from Rs. 900 to Rs. 3,500, and from Rs. 8,300 to Rs. 16,000 per ton, respectively, Government consider it necessary that the selling prices of these categories of steel should be somewhat increased, to meet at least a part of the increased cost of spelter and tin. A separate Notification will be issued in this regard.

CONTENTS

Paragraph

Page

Chapter I

INTRODUCTORY

1.	Terms of reference	1
2.	Scope of inquiry	1
3.	Method of inquiry	2

Chapter II

CONTROL OVER STEEL PRICES

4.	History of control	3
5.	Demand for price inquiry	4
6.	Board's inquiry in 1948-49	5
7.	Government's decisions on the Board's recommendations	8
8.	Implementation of recommendations by the companies	9
9.	Comparison of retention prices as recom- mended by the Board and as fixed by Government	10

Chapter III

WORKS COSTS OF STEEL FOR 1950

10.	Method of analysis	12
11 -12.	Actual works costs for 1950... .. .	13
13.	Difference in organizational structure of major steel producers	16
14.	Effect of differences in corporate struc- tures on works costs	17
15 -16.	Differences between the companies in pro- duction and cost accounting	18
17.	Comparison of works costs	21
18.	Analysis of SCOB's works costs (1950) ..	22
19.	Increased material costs	24
20.	Increased labour costs	25
21.	Stores	26
22.	Fuel	26
23.	Utilities	26
24.	Miscellaneous and excise tax	27

Paragraph		Page
25.	Summary of reasons for increased costs for SCOB	27
26.	Responsibility for increases in SCOB's works costs	27
27.	Tata Company's works costs	30
28.	Comparison of 1948 and 1950 costs	31
29.	Analysis of cost increases	32
30.	Summary of reasons for increased cost	34
31.	Comparison of cost increases	34
32.	Reasons for wide difference in cost increases	34
33.	Rated capacity and production targets	35
34.	Reasons for decrease in SCOB's production in 1950	36
35.	Management's share of responsibility for increases in costs	38
36.	Reasonable compensation for increases in works costs	42

Chapter IV

FUTURE WORKS COSTS

37.	Procedure for cost analysis	44
38.	Definition of plant capacity	45
39.	SCOB's plant capacity	46
40.	Availability of raw materials as a limiting factor	53
41.	Pig iron supply to foundries	53
42.	Essential changes at IISCO and SCOB	54
43.	Operational integration of IISCO's Hirapur works and SCOB's steel works	54
44.	Company's plans for operational integration	57
45.	The grade of pig-iron to be produced at Hirapur furnaces	58
46.	The need for strengthening the higher supervisory staff	60
47.	Provision for supplementary fuel supply	61
48.	Reduction in loss of time for repairs and rebuilding	62
49.	Adoption of blown metal process as one single standard method	63
50.	Alternate operation of the vessels in the Bessemer plant	63

Paragraph		Page
51.	Increasing the charge at the Bessemer converter	64
52.	Targets for future production of SCOB ..	64
53.	IISCO - SCOB Agreement	65
54.	Changes in the bases of estimates agreed to by IISCO and SCOB	67
55.	Items of cost reductions not agreed to by IISCO and SCOB	68
56.	Future costs of raw materials, labour and stores	69
57.	Effect of variations in production on work costs	70
58.	Final revision of production target and works costs estimate for 1951-52	71
59.	Works costs for 1952-53 and 1953-54	71
60.	Tata Company's plant capacity	73
61.	Tata Company's works costs for 1951-52 ..	78
62.	Works costs for 1952-53 and 1953-54	80

Chapter V

OVERHEAD CHARGES

63.	Depreciation	81
64.	Interest on working capital	83
65.	Return on block	84
66.	Head office expenses	87
67.	Selling expenses	87
68.	Margin for contingencies	88
69.	Special charges payable by the Steel Corporation to IISCO	88
70.	Special items of cost for the Tata Company	89
71.	Credit for Tata Company's profits on sale of surplus pig iron, ferro-manganese, etc.	90
72.	Summary of overhead charges	90

Chapter VI

FUTURE RETENTION PRICES

73.	Allocation of overheads	92
74.	Fair ex-works retention prices	92
75.	Uniform retention prices	95
76.	Period of price fixation	97

Paragraph		Page
77.	Future variations in works cost	97
78.	Justification for price increases	99
79.	Miscellaneous	100
80.	Summary of conclusions and recommendations	103
81.	Acknowledgment	106

Appendices

Appendix I.	List of persons who were examined by the Board	108
Appendix II.	Comparative statement showing the Re- tention Prices, as applicable before 1-5-1949, Retention Prices recommended by the Tariff Board and Revised Reten- tion Prices allowed from 1-5-1949 and the increase that accrued to TATAS and SCOB at Revised Retention Prices ..	109



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REPORT ON FAIR RETENTION PRICES OF STEEL

Chapter I

INTRODUCTORY

The circumstances that led to the institution of this inquiry and the original terms of reference for it are stated in the following Resolution of the Government of India in the late Ministry of Commerce, dated 9th December, 1950:-

"No.3-T(4)/50.- In their Resolution No. 3-T(1)/48 dated the 20th May, 1949, published in the Gazette of India Extraordinary, dated the 20th May, 1949, the Government of India announced their decision that the ex-works retention prices of steel produced by the Tata Iron & Steel Company, and the Steel Corporation of Bengal, fixed after consideration of the Report of the Tariff Board, will remain in force, until the 30th April, 1951. The Steel Corporation of Bengal have represented to the Government of India that there has been a great increase in their works costs since the Tariff Board enquiry and that an increase in the retention price of steel is necessary. After considering this representation, Government are of the opinion that the question whether there should be any revision of the retention price of steel for 1950, requires examination. The Tariff Board is, therefore, requested to conduct the necessary enquiries urgently and submit its recommendations to Government. In conducting the enquiry, the Tariff Board is requested to pay special attention to the reasons for increases in costs, if any, and the extent to which these reasons apply equally to both producers. To assist the Tariff Board to assess the effect of technical and managerial efficiency on costs of production, Government will obtain the services of a technical expert."

Subsequently, the Ministry of Commerce & Industry, in their letter No. 1(1)-2(57)/50 dated 10th March, 1951, requested the Board to extend the scope of the inquiry to cover also the future retention prices of steel after 30th April, 1951.

2. In accordance with the Board's terms of reference as stated above,

Scope of we have
inquiry.

(a) to examine the cost of production of steel at the works of the Steel Corporation of Bengal and of the Tata Iron & Steel Company for the year 1950, with a view to finding out whether, and to what extent, the increases in costs are due to factors beyond the control of the manufacturers concerned, and, to what extent, if any, they are due to managerial and operational deficiencies, and in the light of the Board's findings on this matter and taking due account of other relevant factors, to report to Government whether, and to what extent, if any, there should be a revision of retention prices of steel for 1950; and

(b) to estimate the future cost of production of steel at the two works, and determine appropriate rates of overheads and return on capital, and, on that basis, to recommend a suitable schedule of retention prices of steel for a period of two or three years from 1st May, 1951.

3. The Board, in its letter dated 23rd December, 1950, informed the Tata Iron & Steel Company and the Steel Corporation of Bengal that it had been decided to take up the investigation of costs for 1950 by the middle of January, 1951, and requested the companies to prepare and keep ready their cost sheets for examination by the Board's Technical Adviser and the Cost Accounts Officer. The Tata Company's financial year is from April to March while the Steel Corporation adopts the calendar year, i.e., January to December, for its accounts. It was, therefore, decided to examine the costs of production of the Tata Company for the periods October, 1949 to March, 1950, and April, 1950 to September, 1950. In the case of the Steel Corporation of Bengal, the periods selected were January to December, 1949, and January to September, 1950. Both the companies were also requested to submit memoranda on any special points they wanted the Board to consider in estimating their costs. Mr. Peter V. Martin of Koppers Co., Inc. of Pittsburgh, Pennsylvania, U.S.A., who was specially engaged by Government to advise the Board on technical matters, joined the Board on 11th January, 1951. The Board held preliminary discussions with the Technical Adviser and the Cost Accounts Officer on 13th January and the broad lines on which the investigation should be undertaken were decided. The Cost Accounts Officer reached Calcutta on 19th January and, after a preliminary discussion with the Officers of the Steel Corporation of Bengal, proceeded to Burnpur on 21st January. The Technical Adviser reached Burnpur on 23rd January. After a general survey of the plants and machinery at the works of the Corporation and after holding discussions with the management and supervisors at the works, the Technical Adviser issued a detailed questionnaire comprising in all 262 questions to elicit information regarding technical and managerial efficiency. In consultation with the Technical Adviser, the Cost Accounts Officer examined the costs of the Corporation till 6th February. The Cost Accounts Officer next proceeded to Jamshedpur on 8th February and examined the costs of the Tata Iron and Steel Company for the two periods mentioned above. He came back to Bombay on 19th February and reported to the Board the progress so far made in costing. He went back to Jamshedpur for the second time on 24th February and finalised the costs on 9th March. The Technical Adviser also was present at Jamshedpur from 20th February to 9th March. The Technical Adviser also collected information from the Company on the basis of the questionnaire issued on similar lines to the one given to the Steel Corporation of Bengal. The Technical Adviser and the Cost Accounts Officer paid a second visit to Burnpur on the

11th March. They could not come to an agreement with the Steel Corporation of Bengal on the estimates of future costs and, therefore, another meeting was held at Calcutta from 26th to 28th March when the Technical Adviser discussed with the management of the Corporation the points of dispute. The Board examined the representatives of the Tata Company on 9th and 10th April and the representatives of the Steel Corporation of Bengal on 13th, 14th, 16th and 17th April. Shri C. R. Natesan, Deputy Secretary in the Ministry of Commerce and Industry, and Shri M. K. Powvala, Iron and Steel Controller, Government of India, were examined on 18th April. In the light of the discussions held at the meetings, final estimates of costs were worked out and the Technical Adviser submitted a detailed note on the technical and managerial efficiency of the two companies on 15th May, 1951.

Chapter II

CONTROL OVER STEEL PRICES

4. Government control over the prices of steel has passed through three different stages. During the first stage which extended from 1st October, 1939 to 30th June, 1944, control existed only over the prices for supplies meant for war requirements. There was no statutory control over commercial prices. Prices for war supplies were fixed as a result of negotiations between the Government of India and the Tata Iron and Steel Company, who were the main producers of steel at the time. The Company had quoted the prices prevailing in September, 1939. Government agreed to pay these prices with effect from 1st October, 1939 for a period of six months ending March, 1940. These prices were on a f.o.r. works basis. It was also agreed that, on the expiry of this first period of six months, prices for steel supplied for war purposes should be determined afresh by negotiations, for every succeeding six-monthly period, on the basis of the October 1939/March 1940 prices, which were to be increased or decreased according to any rise or fall in the works costs of the Tata Company. The Steel Corporation of Bengal, which came into production shortly afterwards, agreed to accept the same prices as were being paid to the Tata Company. For the first six-monthly period, that is from 1st October, 1939 to 30th September, 1942, the prices remained unchanged. Thereafter, the average price per ton of saleable steel was increased by Rs. 10/- on 1st October, 1942, by another Rs. 4/- from 1st April, 1943, by a third increase of Rs. 6/8/- from 1st October, 1943, and a further increase of Rs. 10/- from 1st April, 1944. The total increase in prices from 1st October, 1939 to 1st April, 1944, was thus Rs. 30/8/- per ton.

In the second stage, which extended from 1st July, 1944 to 31st March, 1946, commercial prices were also brought under statutory control, but the retention prices fixed for the main producers were different for war supplies and for commercial requirements. Control prices for commercial requirements were based on the commercial prices prevalent on 3rd October, 1949, plus the actual increase in costs over those of the base period beginning from 1st October, 1939. The commercial prices for the base period were higher than the war contract prices by Rs. 2 to Rs. 15. The retention prices were fixed on a f.o.r. works basis and not on a f.o.r. port basis, as had been the commercial practice before. This basis for prices remained unaltered up to 1st April 1946, during which period two retention prices obtained, one for war supplies and the other for commercial requirements.

In the third stage, which commenced from 1st April, 1946, retention prices for steel required for war purposes were abolished and only one retention price, which is for commercial requirements, was adopted. These retention prices were fixed ex-works and were payable to the main producers. Selling prices of steel for commercial requirements were, however, different from the retention prices, and such selling prices were quoted ex-port. A uniform port price had been adopted by the main producers with effect from 9th January, 1943. Statutory selling prices have been fixed on the basis of the retention prices plus a surcharge of about Rs. 50 per ton. The surcharge has been levied in order to subsidise imported steel whose prices are much higher than those of Indian Steel. In order to adjust the selling price and subsidise the imported steel, an Equalisation Fund was set up, to which all receipts are credited, and from which all payments to the main producers and re-rollers are made, and the difference between the costs of imports and their selling price is met. The Equalisation Fund at present amounts to about Rs. 2.7 crores. This system is still in force.

5. In January 1947, when the Tariff Board was considering the question Demand for of continuance of protection to the steel industry, the Steel Price Inquiry Corporation of Bengal demanded a full-fledged inquiry by the Tariff Board into the organization, efficiency and equipment of the two steel works for determining fair prices. The Iron and Steel (Major) Panel (1946), set up by the late Planning and Development Department of the Government of India, also recommended that an investigation should be undertaken either by the Tariff Board or by some other independent body in order to determine the fair selling prices of iron and steel. The Panel particularly stressed the point that the internal prices of iron and steel should no longer be related to foreign prices but should be based on the local cost of production including a liberal allowance for

depreciation and return on investment which would not only maintain the industry in healthy condition but also attract adequate fresh capital which its expansion would require. In March 1947, the Tata Iron & Steel Company asked for an increase of retention prices by Rs. 30/- per ton on the basis of increased costs. The Steel Corporation of Bengal also put forward a claim for revision of prices. Government referred the matter to the Commodity Prices Board, which was asked to report on the following points:-

- (i) what should be the fair retention price for billets, and
- (ii) what should be the adjustment in the existing base retention prices for all other categories to give a fair return to the two companies.

The Commodity Prices Board, after a summary examination of the case presented by the Tata Iron & Steel Company, came to the conclusion that there was no justification for an increase in steel prices. The case of the Steel Corporation of Bengal could not be examined as the company did not submit its representation to the Board in time, nor could it send its representative to attend the meeting which the Board had arranged. Before Government could come to a decision on the recommendations of the Commodity Prices Board, both the steel companies represented that, subsequently to the inquiry held by the Commodity Prices Board, the situation had materially changed for the worse and that therefore the question of revision of retention prices should be reconsidered. Government considered this representation and decided that the whole matter should be examined afresh by the Tariff Board and referred the case for a revision of the retention prices to the Board in the Government of India, late Ministry of Commerce, Resolution No. 3-T(1)/48 dated 7th February, 1948.

6. (a) The Board made the necessary investigation and submitted its Report to Government on 28th February, 1949. The Board's main conclusions and recommendations regarding retention prices of steel for the two companies were as follows:-

- (i) Different ex-works retention prices should be allowed to the two companies, as the works costs of the Steel Corporation are invariably higher than those of the Tata Company, the principal reasons for this difference being higher cost of materials, higher expenditure on refractories and higher general works expenses.
- (ii) The Steel Corporation should take immediate steps to effect a substantial reduction in its expenditure on refractories and dolomite.
- (iii) Both the Tata Company and the Steel Corporation should reduce the galvanising and corrugating costs of sheets. In the case of the Tata Company, this is possible by reducing the consumption of spelter and also by reducing the 'stocking and shipping' charges. The Steel Corporation also should reduce its cost by reducing the consumption of sulphuric acid.

- (iv) The Tata Iron & Steel Co. should take early steps to reconstruct its share capital by converting the deferred shares into ordinary ones
 - (v) The Steel Corporation of Bengal and the Indian Iron & Steel Company should examine at a very early date the possibility of integrating the two plants through amalgamation.
 - (vi) The works costs and overheads of the Steel Corporation should be re-examined and fair retention prices reviewed at the end of the year. The cost of production of hot metal should also be re-examined in connection with this general review.
 - (vii) Government should make arrangements to supply spelter to both the companies at the price which the Board has taken in its estimates of costs. Alternatively, the companies should be reimbursed in respect of the total cost incurred owing to the higher price of spelter paid by them on their actual purchases. This payment should be on a normal consumption of spelter at the rate of 170/175 lbs. (gross) per ton of galvanised sheets.
 - (viii) The Steel industry has made certain representations to the Ministry of Industry and Supply in regard to specifications and ordering of tested steel. The proposals in this behalf should receive favourable consideration.
 - (ix) The whole question of the most effective utilisation of steel making capacity in the country deserves early examination with a view to securing an economic integration of the steel industry.
- (b) The Board's estimate of the works costs, overheads and ex-works fair retention prices for the two companies, and the then existing retention prices, were as follows:-

(i) The Tata Iron & Steel Company

Sl. No.	Name of the product (untested quality)	Works cost per ton	Over-heads per ton	Estimated ex-works fair retention price per ton (2 + 3)	The then existing ex-works retention price per ton
	1	2	3	4	5
		Rs.	Rs.	Rs.	Rs.
1.	Blooms ...	107.96	55	163	215
2.	Billets ...	117.81	55	173	190
3.	Tin bars ...	114.73	55	170	190
4.	Sleeper bars ...	121.63	75	197	224
5.	Structurals, bearing plates and crossing sleeper bars ...	143.00	83	226	224
*6.	Rails (heavy) 50/100 lbs.	132.41	83	215	225
7.	Bars and rods (rounds and squares below 3" and flats upto and including 5" wide) ...	137.59	88	226	234

*Tested quality.

	1	2	3	4	5
		Rs.	Rs.	Rs.	Rs.
8.	Bars, other sizes (rounds and squares 3" and above and flats over 5" wide)	138.27	83	221	224
9.	Rails (light), 30 lbs. and below ...	197.33	85	282	250
10.	Fishplates for light rails	271.04	90	361	308
*11.	Fishplates for heavy rails Class 'A' ...	211.43	90	301	283
12.	Black sheets (11-14 gauge)	151.15	98	249	254
13.	Galvanised corrugated sheets (Hard Iron) G/24 (6'/10') ...	287.36	108	395	332
14.	Plates (3/8" and up)	177.29	83	260	221
*15.	Plates acid steel (3/8" and up) ...	361.76	85	447	...
*16.	Pressed sleepers ...	159.78	85	245	...
*17.	Wheels and tyres ...	440.43	120	560	...
*18.	Axles ...	489.30	120	609	...

(ii) The Steel Corporation of Bengal

Sl. No.	Name of the product (untested quality)	Works cost per ton	Over-heads per ton	Estimated ex-works fair retention price per ton	The then existing ex-works retention price per ton
	1	2	3	4	5
		Rs.	Rs.	Rs.	Rs.
1.	Billets ...	163.02	30	193	190
2.	Structurals ...	166.58	66	233	224
3.	Bars and rods (rounds and squares below 3" and flats upto 5" wide) ...	174.44	68	242	234
*4.	Rails (heavy) 50/100 lbs.	168.35	65	233	225
5.	Rails (light) 30 lbs. and below ...	186.03	72	258	250
6.	Black sheets (11-14 gauge) ...	215.32	81	296	254
7.	Galvanized corrugated sheets (Hard Iron) G.24 (6'/10') ...	334.04	92	426	332

*Tested quality.

(c) A comparative statement of fair retention prices, ex-works, for the Tata Iron and Steel Company and the Steel Corporation of Bengal for comparable items, and the then existing retention prices, is given below:-

Sl. No.	Name of the product (untested quality)	The then existing retention price ex-works per ton	Estimated fair retention price	
			Tata Company per ton	Steel Corporation per ton
		Rs.	Rs.	Rs.
1.	Billets ...	190	173	193
2.	Structurals ...	224	226	233
3.	Bars and rods (rounds and squares below 3" and flats upto 5" wide) ...	234	226	242
*4.	Rails (heavy) 50/100 lbs.	225	215	233
5.	Rails (light) 30 lbs. and below ...	250	282	258
6.	Black sheets (11-14 G)	254	249	296
7.	Galvanized corrugated sheets (G.24-6'/10')	332	395	426

*Tested quality.

7. Government's decisions on the Board's recommendations were stated in their Resolution No. 3-T(1)/48 dated 20th May, 1949. As regards the first recommendation of the Board, Government did not consider it desirable to make a radical departure from the then existing practice by fixing separate prices for the two principal producers. It was stated that, with separate prices, there would be less incentive for increasing efficiency, and that the certain expectation that Government would reimburse all increases in cost would give little inducement to reduce costs or to keep increases to the minimum. It was also pointed out that, in the case of the Steel Corporation of Bengal, higher costs were mainly due to the higher price of hot metal which it obtained from their associated company, viz., the Indian Iron & Steel Company. Government, therefore, thought that, if full consideration for the higher cost of steel on account of the higher price of hot metal was given, the Steel Corporation of Bengal would have no inducement to integrate with the Indian Iron & Steel Company, as recommended by the Board. Government, however, considered that the common prices fixed should be such as would enable the Steel Corporation of Bengal also to earn a reasonable profit on its investments. Based on the general lines of increases suggested by the Board, Government proposed to fix a schedule of

prices for all controlled categories of steel which represented roughly an increase of about Rs. 18/- per ton over the then existing retention prices. The Board had also recommended fair retention prices for certain uncontrolled categories of steel, e.g. sleepers, wheels and tyres, axles and acid steel plates; and Government decided that the prices of these categories should also be brought under control with effect from 1st May, 1949, at the prices recommended. In addition, both the companies would be reimbursed the extra cost of spelter as recommended by the Board (*vide* Recommendation vii). Government also decided that the new retention prices should take effect from 1st May, 1949, and remain in force until 30th April, 1951. As regards recommendation (vi), i.e., for a review of works cost, overheads and fair retention prices for the Steel Corporation of Bengal at the end of a year, Government did not accept the recommendation but decided, in the interests of the stability of the price and also for affording adequate time to both companies to carry out the reorganizations recommended by the Board, that the new retention prices would remain in force for a period of two years from 1st May, 1949 to 30th April, 1951. Government agreed with recommendations (ii) to (v) and hoped that the two companies would take early steps to implement them. As regards recommendations (viii) and (ix), it was stated that they were under consideration and that the decision of Government would be announced later. We, however, understand that one part of recommendation (viii), viz., change in specifications for steel required for wheels, tyres and axles has been already taken up by the Railway Board and that, while it has been provisionally decided to permit the use of basic steel in the manufacture of wheels, the question of using basic steel for tyres and axles is being examined.

8. In recommendations (ii) and (iii), the Board had suggested that the two companies should effect a reduction in certain items of costs. How far the companies have been able to reduce their costs, will be discussed in connection with the analysis of works costs. As regards recommendation (iv), wherein it had been suggested that the Tata Company should take early steps to reconstruct its share capital by converting the deferred shares into ordinary ones, we have been informed that the management of the Tata Company is in agreement with the recommendation and that it is taking steps to secure the approval of the shareholders in implementing it. As regards recommendation (v), wherein it had been suggested that the Steel Corporation of Bengal and the Indian Iron and Steel Company should examine the possibility of integrating the two plants through amalgamation, it has been represented to us that an amalgamation between the two companies would be possible only if the shareholders and creditors of both the companies are satisfied that it would be to their advantage to integrate and if they come to an agreement to do so. It

Implementation of
recommendations
by the Companies.

has been further stated that unless and until the Steel Corporation is in a position consistently to declare a dividend comparable with that of the Indian Iron & Steel Company, there would be no hope of carrying a proposal for amalgamation through a shareholders' meeting. We have, however, been informed that the Steel Corporation and the Indian Iron and Steel Company have decided to make certain changes in the administrative set-up of the two units so as to facilitate a larger measure of co-ordination on the production side between the two units. In our previous Report, we had also mentioned that the Tata Company had not adopted the practice of reconciling the cost figures with the financial accounts and suggested that the Company should take steps to effect such a reconciliation as a normal practice. We are glad to note that the Company has already implemented this recommendation.

9. (a) A comparative statement of retention prices of steel for the Tata

Comparison of
retention prices
as recommended
by the Board and
as fixed by Gov-
ernment.

Company and the Steel Corporation of Bengal, as recommended by the Board, and retention prices as fixed by Government, will be found in Appendix II. From this statement, it will be found that the average increase in retention price for all categories of steel was Rs. 14.63 per ton for the Tata Company and Rs. 26.73 per ton for the Steel Corporation. This difference in the average increase in price for the two companies was due to the

fact that, besides manufacturing all the seven categories of steel, which are also produced by the Steel Corporation, and for which uniform revised prices were fixed for both the companies, the Tata Company manufactures seven other controlled categories of steel, such as bars and rods (heavy), fish plates (light and heavy), plates, tin bars and sleeper bars, which are not produced by the Steel Corporation and for which the average increase in price was only Rs. 2.9 per ton as compared with an average increase of Rs. 26.73 for the common categories of the steel produced by both companies.

(b) It will also be seen from the statement that out of the seven common categories of steel, in respect of six categories, viz., billets, structurals, bars and rods (light), rails (heavy), black sheets and galvanized sheets, the fair retention prices recommended by the Board for the Tata Company were lower than those recommended for the Steel Corporation. In respect of one category, viz. rails (light), the retention price recommended for the Tata Company was higher than that suggested for the Steel Corporation. It will also be seen that, in order to give effect to the principle of uniform prices, Government fixed the retention prices at a slightly lower level than those recommended by the Board for the Steel Corporation, except in the case of rails (light) where the retention price fixed was very much lower

than the price recommended by the Board for the Tata Company and only slightly lower than that recommended for the Steel Corporation. The relevant figures are set out in the following two tables:-

Increase (+) or decrease (-) as compared with the retention prices recommended by the Tariff Board.

TABLE I **The Tata Iron & Steel Company**

Category of steel	Retention prices recommended by the Board (per ton)	Retention prices as fixed by Government (per ton)	Increase or decrease over the Tariff Board's figures (per ton)	Production (tons)	Total increase or decrease (in thousands)
	Rs.	Rs.	Rs.		Rs.
Billets	173	190	+ 17	61,000	+ 1,037
Structurals	226	230	+ 4	132,000	+ 528
Bars and rods (light)	226	239	+ 13	94,000	+ 1,222
Rails (light)	282	255	- 27	5,000	- 135
Rails (heavy)	215	230	+ 15	65,000	+ 975
Black sheets	249	292	+ 43	75,000	+ 3,225
Galvanized sheets	395	421	+ 26	48,000	+ 1,248
				480,000	+ 8,100
Average increase per ton ... Rs. 17					

TABLE II **The Steel Corporation of Bengal**

Category of steel	Retention prices recommended by the Board (per ton)	Retention prices as fixed by Government (per ton)	Increase or decrease over the Tariff Board's figures (per ton)	Production (tons)	Total increase or decrease (in thousands)
	Rs.	Rs.	Rs.		Rs.
Billets	193	190	- 3	72,000	- 216
Structurals	233	230	- 3	38,000	- 114
Bars and rods (light)	242	239	- 3	15,000	- 45
Rails (light)	258	255	- 3	1,000	- 3
Rails (heavy)	233	230	- 3	18,000	- 54
Black sheets	296	292	- 4	30,000	- 120
Galvanized sheets	426	421	- 5	50,000	- 250
				224,000	- 802
Average decrease per ton ... Rs. 3.5					

From the figures given above, it will be seen that the retention prices fixed by Government would give for the Tata Iron & Steel Company, on the basis of the Board's estimate of production, an increase of Rs. 17 per ton or a total increase of Rs. 81 lakhs, and for the Steel Corporation a decrease of Rs. 3.5 per ton or a total decrease of Rs. 8.02 lakhs, as compared with the prices recommended by the Board.

Chapter III

WORKS COSTS OF STEEL FOR 1950

10. In accordance with the first part of our terms of reference, we have to examine the works costs of the Steel Corporation of Bengal (subsequently called SCOB) and the Tata Iron and Steel Company (subsequently called Tata Company) for 1950, and assess how far the increases in costs may be attributed to factors beyond the control of the manufacturers concerned, and to what extent, if any, they are due to managerial and operational deficiencies, and in the light of our findings on this matter, report to Government, whether, and to what extent, if any, there should be revision of retention prices of steel for 1950. For this purpose, the Cost Accounts Officer examined the books of the two companies and, wherever necessary, called for additional information on different points and, in consultation with the Technical Adviser, calculated the actual works costs for the two companies for certain sample periods during 1950. He also made detailed estimates of works costs for 1951-52, 1952-53 and 1953-54. The Board requested the Technical Adviser to analyse the works costs for 1950 and assess the responsibility of the various factors for the increases in costs. The Technical Adviser carried out a detailed analysis of the main items of works costs and submitted his report to the Board. This analysis has shown that the three main factors contributing to the variations in the works costs were (a) increases in the prices of raw materials, stores and labour, (b) variations in the usage (consumption) of materials, stores, labour, etc., and (c) changes in the volume of output. Of these three factors, while factor (a) is largely beyond the control of the manufacturers, factors (b) and (c) are almost entirely within such control. Carrying the analysis a step further, it is found that one of the two manufacturers has been able to counterbalance to a large extent the effect of increases in the prices of materials and labour on works costs through managerial efforts and technical efficiency resulting in a higher rate of output and lower rates of usage; while the other manufacturer, owing to managerial and technical shortcomings, has not only failed to neutralise the effect of price increases on works costs but has, on the contrary, been saddled with a further significant increase in such costs owing to a

lower rate of production and higher rates of usage. The full reports of the Technical Adviser and the Cost Accounts Officer are being forwarded to Government as confidential enclosures to this Report. Summaries of works costs as well as a detailed analysis of the main factors responsible for increases in works costs for the two companies are, however, included in this Report.

11. There were certain initial difficulties in determining the costs of production for 1950 at the works of the two companies. First, the Actual works costs for examination of costs had to be undertaken in January, 1951, when 1950. the cost data for the later months of 1950 could not be made available. Secondly, whereas SCOB's books are kept according to the calendar year, the Tata Company's accounts are kept according to the financial year. The Cost Accounts Officer could, therefore, examine the costs in the case of SCOB only for the first nine months, i.e., January to September 1950, and in the case of the Tata Company the period of costing had to be split up into two, viz., (i) from October 1949 to March 1950 and (ii) from April to September 1950. The Board considers that the costs of the Tata Company for the period from April to September 1950 may be taken as representative for the calendar year 1950. The Management of the Company also agreed to this. Similarly, in the case of SCOB, the costs for the period from January to September 1950 have been taken as representative for the whole year.

The method of costing adopted is similar to the one followed at the time of the 1948 inquiry. In the case of SCOB, the hot metal cost has been worked out after allowing for 5 per cent. depreciation on the written down value of the assets of Hirapur works, debenture interest and 5 per cent. surcharge, as required under its Agreement with the Indian Iron and Steel Company (subsequently called IISCO). We mention this especially because in the estimates of future costs for SCOB, we have departed from this method. In working out future estimates, we have considered the IISCO's works at Hirapur and the Napuria steel works of SCOB as an integrated unit, with the result that depreciation, debenture interest and surcharge have been excluded from the hot metal cost. These charges have, however, been added to the overhead charges after estimating the works cost of finished steel for the future. The following statement gives the works cost of the Tata Company and SCOB, as worked out by the Cost Accounts Officer, for 1950 and also, for purposes of comparison, the estimates made by the Board in 1948:-

[Statement No.I on next page]

STATEMENT NO. 1

Statement showing the production and weighted average works cost of the base items of steel

PARTICULARS	DATA COMPANY						SCOB					
	1948 Estimate			April/Sept. '50 Actuals			1948 Estimate			Jan./Sept. '50 Actuals		
	Production	Works cost per ton	Tons	Rs.	Tons	Rs.	Production	Works cost per ton	Tons	Rs.	Production	Works cost per ton
1. Blooms	1,200	107.96	520	112.67	-	-	-	-	-	-	-	-
2. Billets	60,739	117.81	41,827	126.30	72,000	163.02	41,443	202.89	-	-	-	-
3. Tin Bars	72,273	114.73	49,006	119.66	-	-	-	-	-	-	-	-
4. Hoe Bars	4,818	117.47	2,766	122.40	-	-	-	-	-	-	-	-
5. Sleeper Bars	12,163	121.63	773	122.23	-	-	-	-	-	-	-	-
6. Sheet Bars	578	116.90	826	121.27	-	-	-	-	-	-	-	-
7. Rails (Heavy) Tested	65,400	132.41	30,623	145.06	18,000	168.35	2,263	211.74	-	-	-	-
8. Rails (Light)	4,572	197.33	1,572	204.67	626	186.03	1,264	238.69	-	-	-	-
9. Structural, Bearing Plates & Crossing Sleeper Bars	1,32,304	143.00	64,261	154.87	37,518	166.58	28,798	217.71	-	-	-	-
10. Bars and Rods (Heavy)	3,887	136.27	3,567	161.04	-	-	-	-	-	-	-	-
11. Bars and Rods (Light)	93,558	137.59	63,255	146.65	15,416	174.44	13,376	219.28	-	-	-	-
12. Fish Plates (Light)	2,266	271.04	609	280.78	-	-	-	-	-	-	-	-
13. Fish Plates (Heavy) Tested	2,266	211.43	609	221.15	-	-	-	-	-	-	-	-
14. Plates (Ordinary Steel)	53,647	177.29	33,620	164.74	-	-	-	-	-	-	-	-
15. Plates (Acid Steel)	1,504	361.76	83	367.48	-	-	-	-	-	-	-	-
16. Black Sheets (11-14 Gauge)	76,120	151.15	34,860	163.73	29,610	215.32	26,191	271.59	-	-	-	-
17. Galvanized Plain Sheets (Soft Iron) 6.24-6'x10'	9,000	294.19	10,452	276.89	20,000	343.90	8,672	391.92	-	-	-	-
18. Galvanized Corrugated Sheets (Hard Iron) 6.24-6'x10'	32,233	283.36	21,925	277.38	30,000	340.04	24,579	366.62	-	-	-	-
19. Galvanized Corrugated Sheets (Soft Iron) 6.24-6'x10'	7,192	303.39	5,343	267.39	-	-	-	-	-	-	-	-
20. Black Corrugated Sheets (Hard Iron) 6.24-6'x10'	-	-	-	-	-	-	291	304.66	-	-	-	-
21. Pressed Sleepers	28,200	159.78	5,934	200.66	-	-	-	-	-	-	-	-
22. Wheels and Tyres	13,771	440.43	6,760	408.15	-	-	-	-	-	-	-	-
23. Axles	4,300	489.30	1,940	491.19	-	-	-	-	-	-	-	-
TOTAL	6,81,121	160.42	3,75,262	185.78	2,23,170	211.85	1,46,887	262.09	-	-	-	-

After adjustments for pig iron costs. (265.20*)

*After adjustments for pig iron costs.

(265.20*)

12. Our review of the costs and study of the IISCO-SCOB Agreement reveal that SCOB makes final adjustments in its payments to IISCO for pig iron on the basis of yearly and not monthly costs of production. The pig iron costs during the sample period, viz., April to September 1950, were abnormally high due mainly to the low rate of production as one of the two blast furnaces was out of service for relining for four of the six months of the sample period. In effect, the pig iron plant had been operated at $\frac{2}{3}$ of capacity during this period due to the relining of the blast furnace which normally occurs only once every four years. The pig iron production costs, as originally calculated, were accordingly re-calculated on the basis on which SCOB makes payment, viz., average costs for the 12 months period from 1st April, 1950 to 31st March, 1951. The pig iron production during the twelve months period was estimated and the pig iron costs to SCOB re-estimated on the basis that the costs for the sample period were the same as those for the entire year.

A further revision of the pig iron charges to SCOB was also necessitated by a re-examination of the charges for that portion of IISCO depreciation which SCOB is obliged to pay. In the original cost calculations, depreciation charges to SCOB had been based on the entire Hirapur block. This method was proper in the past when the plant facilities at Hirapur were balanced for the production of pig iron only. The building of the new coke oven battery, however, has created a new situation in which the capacity for production of coke is far in excess of the coke requirements of the Hirapur furnaces and approximately 35 to 40 per cent. of the coke production is sold to either Kulti or outside consumers. This coke is sold at controlled prices which leave a margin of substantial profits to IISCO. It was agreed at the hearings by the representatives of IISCO that the depreciation on that part of the coke plant block which was producing coke for sale should be a charge against the profits from such sales and not against SCOB.

The effect of the above two adjustments was to reduce the price of pig iron to SCOB from Rs. 79.71 to Rs. 74.44 per ton. The overall effect of the reduction in pig iron price amounts to Rs. 6.89 per ton of saleable steel, and the average works costs of all saleable steel is thereby reduced from the original estimate of Rs. 262.09 to Rs. 255.20 per ton which cost is considered as the actual average works cost of all categories of saleable steel produced by SCOB during the year 1950 and is the basis for the subsequent analysis.

It will be seen from Statement No. I that as compared with 1948, the actual cost of SCOB has increased by about Rs. 50 per ton and by about Rs. 44 per ton after making adjustments mentioned in the previous paragraphs. In the case of the Tata Company, the increase during the corresponding period is only Rs. 5.66 per ton. In the following paragraphs, we shall discuss the causes for this wide difference in the increases in the costs at the two works.

13. (a) Early in the course of the inquiry, it became apparent that fundamental differences in organizational structure of major steel producers would complicate the inquiry. The Tata Company is a completely integrated unit with all stages of the manufacture of finished steel from the basic raw materials, coal and ore, under unified control and direction. The Company owns and operates collieries and iron and manganese ore mines and is approximately 40 to 50 per cent. self-sufficient in the case of coal and entirely self-sufficient in the case of iron ores. The only major indigenous raw material which the Company does not produce at least in large part is flux which is purchased from independent quarries.

(b) The Company's works at Jamshedpur were built originally in 1911 as an integrated unit for the production of finished steel. Throughout all subsequent stages of modernization and expansion, a proper balance has been maintained between individual units and departments so that all stages of the manufacturing operation were in proper phase with each other for the sole ultimate objective of producing finished steel. The rolling mill capacity has been proportioned to the steel making potential, the blast furnaces have been designed to supply the iron required by the steel making furnaces and the coking capacity has been kept in step with the blast furnace requirements. Manufacture of products other than semi-finished and finished steel is only incidental to the works operation and is not a factor in establishing plant practices. Since the purpose of the plant is solely to produce steel and all plant facilities are under one ownership, there are no inter-company profits and all charges at each intermediate process stage are carried through to the final product at cost.

(c) SCOB, on the other hand, is not an integrated company capable of producing steel from coal and ore. The Company's works at Napurria were not designed as an integrated plant but were built to produce steel from pig iron purchased on a cost plus and profit-sharing basis from the production of the already existing Hirapur blast furnaces of IISCO. SCOB, therefore, has little, if any, control over either the cost or quality of its major raw materials and the financial results of its operation at least in part are dependent on the policies and practices of IISCO.

The relationship between the two companies is governed by a covenant known as the IISCO-SCOB Agreement. Under the terms of this agreement, under certain conditions, it is quite possible for IISCO to make greater profits from iron sold to foundries than the profits to be made from iron supplies to SCOB. It is apparent that under such conditions there is apt to be difficulty in maintaining a proper community of interests between the two companies as the supplying of the maximum potential pig iron requirements of SCOB can result in a diminution of profits to IISCO. The effects on SCOB's operations and earnings of any such failure on the part of IISCO to furnish iron in proper quantity

or of proper quality would not be so severe were there in India as in most other countries alternative sources of raw material supply either in the form of scrap or pig iron. Unfortunately, in India there are no such alternatives. Accordingly, under present conditions, the financial results of SCOB's operations may be greatly influenced by the policies, performance and self-interests of IISCO. SCOB's position in this respect is rendered even more precarious by the fact that the penalty clauses in the agreement for failure on the part of IISCO to deliver iron of the proper quality or sufficient in quantity are extremely weak and of little practical value to SCOB.

14. The differences in the corporate structure of the two producers naturally lead to differences in the costing practices. At Tatas there are no "inter-company" changes and the intermediate products of each phase of the operations are charged into subsequent operations at the pure "works cost". At SCOB, on the other hand, the major raw material, pig iron, as well as certain others are purchased from IISCO at a price which includes certain elements of overheads and profits. Such additional charges in 1950 added approximately 17 per cent. to the charges for pig iron supplied to SCOB above the actual IISCO costs. The extra increment of cost of producing a ton of saleable steel which this "inter-company" charge adds to steel produced at SCOB is approximately Rs. 14-6-0. As there is no comparable charge at Tatas, SCOB's works costs even with equal efficiency at each plant would be higher than the Tata Company's by the amount of this "inter-company" profit.

SCOB also purchases a number of services such as fuel, water, power and steam from IISCO on a cost plus service charge basis. The service charge is an additional "inter-company" profit for which no corresponding element of cost appears in the Tata works accounts. It is not the intent here to question in any way the propriety of any such inter-company charges, but it is important that attention be called to such charges as works cost comparisons cannot be made between the cost sheets of the two producers without due regard to differences in costs emanating from the different corporate structures. Neither is it intended to imply in any way that the charges to SCOB for iron and service under the IISCO-SCOB Agreement result in an unwarranted increase in the overall cost of producing steel at SCOB's. On the contrary, the arrangement between IISCO and SCOB may result in substantial economies in SCOB's total costs under certain conditions. The increase in works costs to SCOB as a result of the charges payable under the IISCO-SCOB Agreement may be more than offset by the substantial reduction effected thereby in SCOB's overhead charges in comparison with those of an integrated works. The IISCO-SCOB Agreement in general

appears to be more favourable to SCOB than to IISCO and becomes unfavourable to SCOB only under the condition that SCOB is prevented from producing a maximum quantity of steel as a result of the failure of IISCO to supply iron in required quantity or of satisfactory quality.

15. (a) The differences in costing practices described in the foregoing paragraphs, while complicating comparisons between the two works, can be resolved readily. Further more, the so-called "inter-company" profits in the case of SCOB can be accurately calculated and, for comparison with the works costs of an integrated company, eliminated from SCOB's works costs and considered as overheads. There are, however, other more basic differences in the accounting practices of the companies with respect to both production and cost accounting which render accurate comparison of works costs, particularly in the case of individual departmental units or individual intermediate products, extremely difficult and of doubtful accuracy. These differences emanate chiefly from what may be termed "loose" accounting practices at IISCO and SCOB, the result of which is inaccurate allocation of production and costs to departmental units and intermediate products and distortion of the structure of works costs. Such costing practice makes accurate determination of the efficiency and costs of any individual unit impossible and renders such costs of little value for the major purpose for which cost data are kept, which is to supply accurate tools for the use of the management in executing its responsibility for the proper direction and efficiency of the works.

(b) Several specific examples of what is herein termed "loose" accounting are cited below:-

(i) *IISCO- Coke plant:* The coke plant costs and production records are maintained on the basis of a total yield of coke equal to 80 per cent. of the coal charge. This yield, as is admitted by plant management, is too high for the Indian coals used at Hirapur. The Tata Company, using coals of quite similar nature, report a yield of only 75 per cent. At the most, the highest yield which can be realized at Hirapur does not exceed 77 per cent. of the coal charged. The use of the inaccurate coke yield figure at IISCO results in reporting a production of coke at least 4 per cent. higher than the actual production. In turn, as a result of the error in the production accounting, the reported works cost of coke is lower than the actual works costs.

(ii) *Blast furnace - Coke consumption:* The reported blast furnace coke consumption per ton of iron is much too high at IISCO. The coke charged to the furnaces is not weighed. For purposes of costing, the entire reported production of coke of furnace grade minus the coke sold is charged to the furnaces. In the preceding paragraph, it has been shown that the actual

coke production is at least 4 per cent. less than the reported production. The increasing amount of coke sales which were weighed from this works during the past years has tended to increase this discrepancy to the extent that the actual total furnace coke consumption is probably 6 to 10 per cent. lower than the reported consumption as the furnaces are charged not only with the production short-fall in the coke they themselves consume but also the short-fall in the coke sold.

The plant management, while agreeing with the above conclusions, defended the practice on the basis that overall costs were not affected thereby. To some extent, this assertion may be true. On the other hand, without proper and accurate production and cost records for each department and intermediate products, management cannot detect the weak links in the production chain nor can the operations of any individual department be analysed in comparison with normal standards and proper corrective measures taken.

Plant management, however, did agree in the estimates for the future to reduce the coke yield to 77 per cent. This should help to correct certain of the present inaccuracies in the plant records.

(iii) *Yield and production:* The hot metal delivered to SCOB is weighed. Hot metal delivered to the pig machine, however, is not weighed and the weight of the cold pig is added to the weight of hot metal delivered to SCOB to arrive at the total pig iron production. Pig casting losses may be of the order of 5 to 10 per cent. and when large proportions of the total furnace production are delivered to the pig machine without weighing of the hot metal as at Hirapur, inaccurate production and yield figures may result. For proper control and comparisons of practice, all hot metal should be weighed and pig machine losses and yields determined.

(iv) *SCOB:* Proper cost accounting practice requires that every effort be made to assign all items of costs which can be directly charged to individual products, intermediate products or departments, directly to such products or departments; and that every effort be made to minimise charges to overall cost categories such as "general works" to only those charges which are difficult to assign directly. Likewise, charges to the item of "provisions" should be restricted to major cyclic work such as rebuilding which does not occur regularly during each monthly costing period and which because of its magnitude would otherwise introduce variations of appreciable degree in periodic monthly cost statements. By following such a policy, the Tata Company succeeds in holding down the "general works" costs to about 14 per cent. and the charges for provisions to about 19 per cent. of its conversion costs, in departments similar to those of SCOB. AT SCOB, however, these items constitute respectively approximately 27 per cent. and 25 per cent. and come to a total of

52 per cent. of conversion costs in comparison with a total of 33 per cent. at Tata's.

The practice at SCOB is to charge practically all repair labour throughout all departments to the Maintenance Engineering Department in the case of mechanical repairs and to the Electrical Engineering Department in the case of electrical repairs. Labour involved in brick work is charged to the Brick Department. The total costs of all three departments are transferred into the general works account. The entire general works costs are then loaded on to the cost of ingots. The ingot cost, therefore, bears a large proportion of the maintenance costs of the rolling operations resulting in complete distortion of the operating costs of all the individual unit operations and intermediate products. The inaccuracy of this practice was pointed out to SCOB's representatives by the Board at the time of the 1948 hearings. The Company, however, to date has made no change in its costing practice in this respect.

The Cost Accounts Officer, for the purposes of the present study, has re-distributed the general works expenses to the various departments in accordance with normal cost accounting practice. While this procedure tends to present a somewhat less inaccurate picture of individual costs, it, nevertheless, does not permit proper cost analysis, which would be made possible only by adoption of the standard practice of charging maintenance expense, to the greatest extent possible, directly to the individual plant units.

The degree of the distortion created by SCOB's practice is indicated by the fact that these three items alone amount to over 50 per cent. of the general works charges and aggregate approximately Rs. 17 per ton of saleable steel.

The Traffic Department at SCOB is also included in the general works account. Traffic Department charges should properly be charged, as incurred, to each department under the "services" item. They should not be lumped and arbitrarily distributed on an artificial basis as a portion of general works expense.

The same general conclusions are also true with respect to material in repairs. The general policy at SCOB is to lump most of repair materials under the caption of "provisions, re-building and renewals". A strict line of demarcation in the costing system should be maintained between these materials which are consumed in ordinary day to day running repairs and which should be charged to stores or material in repair, and those materials which are required in cyclic periodical re-buildings or re-linings and should accordingly be carried as a provision charge.

16. The above divergencies from normal costing practice in the case of SCOB make direct comparison of the cost sheets unit by unit or product by product with those of the Tata Company, who follow to a great extent standard practice, or even with normal world standards of performance, practically impossible. Proper analysis and control of operations and correction of bad practices and high costs by plant management are also rendered extremely difficult. A thorough review and revision of the costing system is required at SCOB in order that the management may have proper tools with which to appraise the results of plant operations so as to be able to exercise more effective control over costs.

17. For purposes of comparison, the 1950 costs of each individual category of saleable steel for the two companies are shown below:-
Comparison of works costs.

		SCOB	TATA
Billets	Rs.	196.64	125.30
Heavy rails	"	205.11	145.05
Structurals	"	211.29	154.87
Light bars	"	212.89	146.65
Light rails	"	232.00	204.67
Black sheets (11-14G.)	"	263.94	153.73
Galvanized sheets plain (soft)	"	324.27	276.99
Galvanized corrugated (hard)	"	378.97	277.38
Black corrugated (cold rolled)	"	297.00	-
Weighted average all products	"	255.20	165.78*
Board's 1948 estimate	"	211.85	160.12
Increase 1950 over 1948	"	43.35	5.66

* Weighted average all products produced by Tatas including those not rolled by SCOB.

The above tabulation shows that the works cost per ton of saleable steel increased at both works between the years 1948 and 1950. The order of magnitude of the increases at each plant, however, is very different. For the Tata Company, the total increase amounts to Rs. 5.66 per ton; for SCOB, however, the overall increase is Rs. 43.35 per ton. For the Tata Company, increase in average costs amounts to only 3.53 per cent., while the percentage increase for SCOB is 20.47. The rupee increase per ton for SCOB is 7.66 times and the percentage increase for SCOB is almost six times as great as that for the Tata Company.

Of even greater significance is the fact that the spread in costs between the two works has shown a steady increase each year as indicated below:-

	<u>SCOB</u>	<u>TATA</u>	<u>SPREAD</u>
1948 estimate	Rs. 211.85	160.12	51.73
1949 actuals	Rs. 235.26	165.54	69.72
1950 actuals	Rs. 255.20	165.78	89.42

The Board's 1948 estimates indicated that SCOB's works costs at that time were Rs. 51.73 per ton higher than those of the Tata Company. In 1949, however, the differential in costs between the two plants had increased by Rs. 17.99 per ton and in 1950 still further by an additional Rs. 19.70 to a total differential of Rs. 89.42. SCOB's works costs, which in 1948 had been estimated by the Board to be 32 per cent. or approximately 1/3rd greater than those of the Tata Company, became 54 per cent. higher or more than 1½ times those of the Tata Company. It is of particular significance in this connection, that while the Tata Company has managed to hold its works costs relatively constant each year, the costs of SCOB have increased by almost 20 rupees per ton per year in the last two years.

18. (a) In order to determine the reasons for the increased costs at SCOB and to analyse the causes thereof, the distribution of works costs between various elements for each year and the per cent. increase between 1948 and 1950 are shown below:-

	Board's estimates 1948 Rs.	Actuals 1950 Rs.	Per cent. increase
Total material cost per ton (gross)	118.63	136.99	15.5
Less credits for scrap, dross, etc.	18.66	23.10	23.8
Total net material cost	99.97	113.89	13.9
Fuel	14.71	16.23	10.3
Labour	22.31	29.01	30.0
Utilities	6.08	6.88	13.2
Stores	11.23	10.41	- 7.3
Services .l ..	0.98	1.59	62.2
General works	29.35	38.92	32.6
Repairs and renewal provisions	22.19	36.26	63.4
Excise duty	4.93	5.17	4.9
Total	211.75	258.36	22.0

It will be noted that there is a discrepancy of about Rs. 3 per ton between the average cost as calculated above and the average costs as shown

in Statement I (para. 11). This discrepancy results chiefly from neglecting to compensate for quantities of semi-finished material put into or taken out of stock at the finishing mills during the sample period. Inspection of the works costs indicated that these changes were of a minor nature. As the discrepancy is only slightly in excess of 1% and within the overall limits of accuracy of the present study, it does not decrease the value of the analysis for the purpose for which it has been made. Proper compensation is made for this discrepancy in subsequent calculations.

(b) The above tabulation shows that the increase in net material cost in 1950 over 1948 has been Rs. 13.9 per ton equivalent to an increase of 13.9 per cent. and that the conversion cost has increased by Rs. 32.69 per ton equivalent to an increase of 29.2 per cent. The breakdown of works costs by per cent. for each year is shown below:-

	<u>1948</u>	<u>1950</u>
	per cent	per cent
Net materials	47.20	44.08
Cost above material	50.46	53.92
Excise duty	2.33	2.00

(c) Certain categories of steel works costs such as services, general works and provisions consist essentially of labour and stores and can be broken down with fair accuracy into these items. The Cost Accounts Officer has calculated that the total costs of the items of general works, services and provisions at SCOB's can be distributed as follows:-

	<u>Labour</u>	<u>Stores</u>	<u>Miscellaneous</u>
	per cent	per cent	per cent
General works	71	19	10
Services	40	60	-
Provisions	..	100	-

On the basis of the above distribution the costs of SCOB may be allocated as follows:-

		<u>1948</u>		<u>1950</u>
	Rs.	Rs.	Rs.	Rs.
Net material cost		99.97		113.89
Labour:-				
Departmental	22.31		29.01	
Services	0.39		0.64	
General works	<u>20.84</u>	43.54	<u>27.63</u>	57.28
Stores:-				
Departmental	11.23		10.41	
Services	0.59		0.95	
General works	5.58		7.39	
Repairs & renewals	<u>22.19</u>	39.59	<u>36.26</u>	55.01

	1948 Rs.	1950 Rs.
Utilities	6.08	6.88
Fuel	14.71	16.23
Miscellaneous	2.93	3.90
Excise duty	4.93	5.17
	<u>211.75</u>	<u>258.36</u>

The calculated increase in each item and the per cent. increase between 1948 and 1950 are shown below:-

	<u>Rupee increase</u>	<u>Per cent. increase</u>
Net material	13.92	29.86
Labour	13.74	29.48
Stores	15.42	33.08
Utilities	0.80	1.72
Fuel	1.52	3.26
Miscellaneous	0.97	2.08
Excise duty	0.24	0.51
	<u>46.61</u>	

(The actual increase is about Rs. 44. The discrepancy is due to approximations).

19. The above tabulation shows that about 30 per cent. of the total increase in costs between the two years was due to increased material costs. Practically, all raw materials used by SCOB are purchased. The causes of increased material costs may therefore be (1) increased prices of materials, and (2) increased consumption. In the economy of scarcity which has existed recently, it is fair to assume that SCOB had little chance of exercising any control over the prices which it paid for purchased materials. On the other hand, with reference to consumption, it is equally logical to assume that unless there were very good reasons to the contrary, the consumption of materials was entirely within SCOB's control. It is, therefore, necessary to determine what proportion of the increased material costs resulted from rises in the prices of materials and what proportion originated from an increase in the consumption of materials.

The raw materials which are used by SCOB, together with the average prices of each for the years 1948 and 1950 and the 1948 consumption rate per ton of saleable steel, are listed below:-

	Consumption	1948	1950
	Tons	Rs.	Rs.
Pig iron	1.200	69.00	74.44
Iron ore	0.060	7.63	9.92
Manganese ore	0.006	51.12	38.73
Lime	0.058	22.82	24.40
Fluorspar	-	156.35	171.32
Dolomite	0.051	47.77	53.62
Scrap	0.184	57.58	56.37
Scale	0.017	7.50	7.50
Ferro-alloys	0.013	461.29	492.26
Spelter	0.017	898.09	898.09

The effect of increases in raw material prices on the cost of producing steel may be calculated by multiplying the quantities of raw materials consumed per ton of saleable steel established by the Board in the 1948 estimates by the 1950 raw material prices. This calculation shows that the gross cost of materials on the basis of 1948 quantities and 1950 prices should have been Rs. 126.48 per ton of saleable steel. The credits for scrap, calculated on the same basis of 1948 quantities and 1950 prices, should have been Rs. 18.88 per ton of saleable steel. Accordingly, the net cost of materials per ton of saleable steel for 1950, had consumption been at the same rate as in 1948, should have been Rs. 107.60. The increase in cost of raw materials due to rise in price was, therefore, Rs. 107.60 - 99.97 or Rs. 7.63 per ton. The net raw material cost, however, was actually Rs. 113.89. The difference between Rs. 113.89 and Rs. 107.60, the calculated cost as a result of higher prices, represents the amount of increased costs due to higher usage of materials and is equal to Rs. 6.29 per ton. As will be shown later, the portion of increased costs from greater usage of raw materials resulted from decreased overall yield of saleable steel from raw materials.

20. SCOB's memorandum to the Board states that the annual expenditure for wages has increased from Rs. 95.46 lakhs in 1948 to Rs. 118 lakhs in 1950 - an overall increase of 23.6 per cent. The Cost Accounts Officer has checked the wages bill and agrees that the overall increase is approximately 23 per cent. The increase in wages bill has originated from the following sources:- (1) normal annual increments, (2) awards of the 1948 Wage Tribunal, (3) new wage structure, and (4) Anomalies Committee findings. These must be considered as an increase in price for which SCOB cannot be assigned direct responsibility. Preceding statements have shown that the total labour charges per ton of saleable steel in the Board's 1948 estimates was Rs. 43.54. An increase of 23 per cent. due to the cost of labour, amounts to Rs. 10.01, which results in increasing the labour cost to Rs. 53.55 per ton. The actual labour cost per

ton of saleable steel was, however, Rs. 57.28. The difference of Rs. 3.73 represents increased usage of labour which was occasioned by failure to produce at the rate on which the Board's cost estimates were based.

21. The Company's memorandum claims an increase in the cost of stores due to rise in price of approximately 36 per cent. The data presented to the Stores. Cost Accounts Officer to substantiate the Company's estimates, however, contained but a relatively few selected items of the many thousands used in a steel mill. In discussions with the Cost Accounts Officer, the Company agreed that the data were not exhaustive. The Cost Accounts Officer examined the prices and usage of a large number of stores items and has concluded that in the case of SCOB, the overall weighted increase in prices of stores was of the order of 20-25 per cent., which may be considered for purposes of this investigation as 22.5 per cent. It is of interest to note that the actual expenditure on the "stores" item in SCOB's cost sheets decreased, and the whole increase in the "stores" and provisions costs emanated from additional charges to provisions. On the basis of the total stores and provisions items which aggregated Rs. 39.59 per ton in the Board's 1948 estimates and an average increase in price of 22.5 per cent., the increase in store costs due to price alone should have been Rs. 8.91 which would have raised the costs for stores to Rs. 48.50. The actual store costs, however, are shown as Rs. 55.61 which indicates a usage of stores greater by Rs. 6.51 than had been provided in the Board's estimates.

22. The cost of fuel per ton of saleable steel increased by Rs. 1.52 from Rs. 14.71 to Rs. 16.23, an increase in the cost of this item by Fuel. 10.3%. The weighted average unit price of all fuels, however, declined from Rs. 23.69 in 1948 to Rs. 22.94 in 1950 per equivalent ton of coal. This decrease in price when applied to the Board's 1948 estimates of usage, should have reduced the fuel costs by 2.26%, equivalent to Rs. 0.48, to Rs. 14.23 per ton. The difference between actual charges and calculated charges based on 1950 prices and 1948 usage (equivalent to Rs. 16.23 - Rs. 14.23) equals Rs. 2.00 and represents the increase in fuel costs due to increase in usage of fuel.

23. Costs of utilities increased between the two years by 13.2% from Rs. 6.08 Utilities. to Rs. 6.88 per ton. The utilities item includes steam, water and power. Of these three items, the unit price of water remained stationary, that of steam increased and power decreased. The overall effect of the changes in the prices should have been to reduce the cost of utilities based on the 1948 consumption by 1.4% to Rs. 5.99 per ton. The increase in the cost of utilities due to usage accordingly was Rs. 6.88 - 5.99 = Rs. 0.89 per ton.

24. The miscellaneous cost category includes such items as insurance and a number of small items which are relatively fixed and which tend to vary in inverse ratio to production and so are to some extent also dependent on yield. On this basis, the increase due to usage is Rs. 0.33, price Rs. 0.64 and excise Rs. 0.24.

25. Summarizing the conclusions of the preceding paragraphs the distribution and allocation of the cost increases at SCOB by major cost categories is as follows:-

Summary of reasons
for increased costs
for SCOB.

	Price	Usage
	Rs.	Rs.
Net materials	7.63	6.29
Labour	10.01	3.73
Stores	8.91	6.51
Fuel	- 0.48	+ 2.00
Utilities	- 0.09	+ 0.89
Miscellaneous and excise duty	0.64	0.57
	<u>26.62</u>	<u>19.99</u>

The above tabulation shows that of the overall increase of Rs. 46.61 indicated by the cost calculations, Rs. 26.62 can be attributed to the effects of increases in price and Rs. 19.99 to increases in usage. In adjusting these calculations to the actual increase in cost of approximately Rs. 44, Rs. 26 has been assigned as the portion of the actual increase due to price factor, and Rs. 18 as the increase due to usage. This allocation makes due compensation for the changes in stocks of semi-finished materials at finishing mills referred to in paragraph 18(a).

26. In its 1948 estimates, the Board established a production target of 223,170 tons of saleable steel for SCOB and based its estimates of works costs on the attainment of that target. The preceding paragraphs show that had the Company produced at the rate set by the Board, its works costs would have increased by approximately Rs. 26 per ton due solely to increases in prices for materials, supplies and services, such as labour, which it purchased and over the prices of which it had very little, if any, control and, accordingly, the firm cannot be held responsible for such price increases. The Company does have responsibility, however, for the utilization of its equipment and purchased commodities and in a later part of the Report examination will be made of the question of

Responsibility
for increases
in SCOB's works
costs.

whether in the light of any changes in circumstances in 1950 from those prevailing in 1948, the Company could have offset a portion of the increased costs due to increases in price by measures which in one way or another would have provided at least partial compensation for price increases.

The balance of the works costs increases amounting to approximately Rs. 18 per ton has been caused by increased usage of materials, labour and supplies resulting from deterioration in the plant's operating standards during the period below those which were being attained during the period of the Board's study in 1948 and upon which the Board's estimates were based.

The major items in which such deterioration occurred were (i) the overall yield of saleable steel from raw materials charged at the steel melting shop, and (ii) the total production of saleable steel itself. The overall yield of saleable steel from the metallic charge was established in the 1948 estimates as 69.12 per cent. The overall yield reported during the sample period in 1950 was 63.77 per cent. The decreased yield resulted in a higher consumption of raw materials by 7.7 per cent. which, after credit for increased production of scrap, accounts for the increase of Rs. 6.29 per ton for material usage. The entire increase in usage of raw materials can be attributed to this cause.

The Company's explanation for the decrease in yield is chiefly that a larger scrap discard from the ingot was made at the blooming mill during 1950. It is true that the yield of blooming mill product historically reported until 1950 has been abnormally high. On the other hand, despite persistent questioning of the company's representatives, no clear-cut answer has been given as to whether the recent corrections were of a clerical and accounting nature or whether the percentage of discard has been actually increased. From the Company's answers, it would appear that both have been done; that the discard has been increased somewhat and also that some "book keeping" adjustments have been made. The Company's claim, however, is not borne out by any improvement in yields at the finishing mills which should have shown higher yield as the result of the greater blooming mill discard. Actually, a certain overall amount of total scrap discard from the ingot to finished product is required, and, from the point of view of yield only it is immaterial whether such discard is made in the primary or secondary mills - the overall yield in the absence of a major change in products should be relatively constant.

A very serious decrease also occurred in the reported yield of ingots from the metallic charge at the steel melting shop which in the Board's estimates was established as 85.17 per cent. and in 1950 was reported as 82.47 per cent.

Practically, however, it is impossible to assess the yield practice of any individual department due to the fact that there is no practice of weighing at intermediate stages, between charging of raw materials at the melting shop and the finished product stages. The overall yield estimates of the Board in 1948 were those actually being achieved at that time and were not unrealistic. The only factor beyond the control of management which could have properly resulted in decreased yield was a very major change in the type of, and specifications for, the plant's products. There is no evidence of any appreciable change in these respects. The lower yield of products as well as the higher usage of materials in 1950 resulted from deterioration in the standards of metallurgical and technical practice at these works between the two years.

The remainder of the cost increases due to usage, amounting to approximately Rs. 12 per ton, occurs in the category of "conversion costs above materials" which consists essentially of labour, fuel, power and stores. Conversion costs for a specific plant or unit are a function of the rate of production. The effect of a higher rate of production is to reduce conversion costs. Conversely, a decreased production rate always results in higher conversion costs. The effect of operating rates on conversion costs varies from country to country and from plant to plant. In India, however, within normal ranges of operating rates, it is indicated that, with all other factors constant, an increase of 1 per cent. in the production rate of a steel plant should result in a decrease of approximately 0.5 per cent. to 0.6 per cent. in the conversion costs. In other words, if a steel plant whose conversion cost is Rs. 100 at a 50 per cent. rate of production were to increase its production rate to 100 per cent. without increase of working force or number of operating units, the conversion cost should decrease to the order of approximately Rs. 75-70.

The increase of Rs. 12 in conversion costs is 8.7 per cent. of the 1950 conversion costs calculated on the basis of 1950 prices. The decrease during the sample period in production from the Board's 1948 estimates amounted to 12.2 per cent. In normal Indian practice, this decrease in production rate would have caused an increase of about 6-7 per cent. in conversion costs. In this case, the actual percentage of increase in works costs is somewhat higher due to the fact that the decreased production was accompanied by a simultaneous decrease in yield. To the normal increase in conversion costs as a result of lower production rate, an extra increment of cost was added as the result of processing through at least some stages of the production cycle extra material which was subsequently scrapped. In this connection, it is significant that approximately 17,000 tons of saleable steel were lost during

the year due to decrease in yield only. The additional amount of material required to produce this steel was actually subjected to at least partial processing and the conversion charges increased proportionately.

It is evident from the preceding analysis that at least Rs. 12 of the total increase in the works costs of SCOB was the result of lower production. In a subsequent part of this Report dealing with the production potential of SCOB, examination will be made to determine whether any part of this portion of the increased costs as well as any part of the Rs. 26 increase due to price was the result of technical or managerial inefficiency.

27. In an earlier part of this Report, reference has been made to the difficulties of direct comparison between the works costs estimates of the Tata Company and those of SCOB. Among the causes of such difficulties are the differences in corporate structures, one company being integrated and the other non-integrated and the differences in the accounting practices followed by the two companies. From the overall point of view, there is another difference which makes direct comparison difficult - the difference in product mix. In an effort to compensate for all such differences to the greatest degree possible, the Tata Company works costs have been re-calculated. It has been assumed as the basis of these calculations that the Tata Company's like SCOB were a non-integrated works and purchased its major materials from an adjacent pig iron plant. The production of the same total amount of saleable steel as at SCOB has been assumed and the product mix has been made identical to that of SCOB. The costs to produce the requisite quantities and types of saleable steel from purchased pig iron have been calculated on the basis of the Tata Company's practice and works costs.

As the purpose of the calculations is to secure comparative information as to the degree of any changes in works costs of the Tata Company between the two years, it has not been considered necessary to complicate the calculations by adding any charges for "inter-company" profits.

The following statement indicates that the weighted average of the works cost of the Tata Company for the particular products which are also made by SCOB has increased from Rs. 166.13 in 1948 to Rs. 170.10 in 1950 as compared with an overall increase of Rs. 5.66 for all products of the Tata Company. This represents an increase of Rs. 3.97 per ton of saleable steel and is equivalent to an increase of 2.4 per cent. The distribution of total costs for the two years between various cost elements is as follows:-

	1948	1950	Increase
	Rs.	Rs.	Rs.
Materials (gross)	91.47	93.87	2.40
Less credits	<u>20.86</u>	<u>21.65</u>	<u>0.79</u>
Net materials ...	70.61	72.22	1.61
Fuel ...	12.69	12.19	-0.60
Labour ...	26.78	27.29	0.51
Utilities ...	5.43	5.78	0.35
Stores ...	11.57	10.01	-1.56
Services ...	4.38	4.45	0.07
General works ...	13.75	14.11	0.36
Provisions ...	15.72	18.78	3.06
Excise duty ...	<u>5.20</u>	<u>5.27</u>	<u>0.07</u>
Total	<u>166.13</u>	<u>170.10</u>	<u>3.97</u>

The items of services, general works and provisions, as at SCOB, are composed chiefly of labour and stores but in a somewhat different proportion as follows:-

	Percentage labour	Percentage stores	Miscellaneous
General works	75	14	11
Services	65	35	-
Provisions	25	75	-

28. After pre-rating the cost of services, general works and provisions, to labour, stores and miscellaneous in accordance with the above distribution, the allocation of the various categories of works costs during the two years at the Tata Company is as follows:-

	1948	1950
	(per ton of saleable steel)	
	Rs.	Rs.
Total material cost (gross)	91.47	93.87
Less credit (scrap, dross, etc.)	<u>20.86</u>	<u>21.65</u>
Net material cost-	70.61	72.22
Fuel	12.69	12.19
Labour:		
Departmental	26.78	27.29
Services 65%	2.85	2.89
General works		
75%	10.31	10.58
Provisions 25%	<u>3.93</u>	<u>4.70</u>
	43.87	45.46

		32		
Stores:		1948		1950
		Rs.		Rs.
Departmental	11.57		10.01	
Services 35%	1.53		1.56	
General works 14%	1.93		1.98	
Provisions 75%	<u>11.79</u>	26.82	<u>14.08</u>	27.63
Utilities		5.43		5.78
Miscellaneous		1.51		1.55
Excise duty		<u>5.20</u>		<u>5.27</u>
		<u>166.13</u>		<u>170.10</u>

The rupee value of the cost increase and the percentage increase are shown below:-

	Rupee	Percentage
Total material ...	2.40	2.62
Less credit ...	<u>0.79</u>	<u>3.79</u>
Net material ...	1.61	2.28
Fuel ...	-0.50	-3.94
Labour ...	1.59	3.62
Stores ...	0.81	3.02
Utilities ...	0.35	6.45
Miscellaneous ...	0.04	2.65
Excise duty ...	<u>0.07</u>	<u>1.35</u>
Total	<u>3.97</u>	<u>2.39</u>

In the following paragraphs, the causes for the changes in the various cost categories have been determined on the basis of price and usage in the same manner as was done in the case of SCOB in the earlier part of the Report.

29. (a) *Materials:* The raw materials used by the Tata Company from the steel making stage onward, together with the average prices of each cost increases. for the years 1948 and 1950 and the 1948 consumption rate per ton of saleable steel, are shown below:-

	Consumption	P r i c e	
	in 1948	1948	1950
	Tons	Rs.	Rs.
Hot metal ...	1.241	46.360	46.740
Cold metal ...	0.016	55.800	55.020
Scrap ...	0.295	39.972	45.668
Scale ...	0.023	3.000	3.545

		Consumption	Price	
		in 1948	1948	1950
		Tons	Rs.	Rs.
Iron ore	...	0.013	6.943	7.054
Ferro-alloys	...	0.018	245.001	262.668
Lime stone	...	0.026	6.930	11.018
Flourspar	...	0.001	298.177	325.580
Lime	...	0.046	30.780	39.560
Spelter	...	0.021	832.450	832.450

Multiplication of the 1948 usage figures by the 1950 prices shows that the overall gross material costs as a result of price increases have increased by Rs. 2.37 from Rs. 91.47 to Rs. 93.84 per ton of saleable steel. Similarly, due to changes in prices for scrap and dross, the credit for scrap recoveries based on the 1948 standards of usage increased from Rs. 20.86 to Rs. 23.34. The net material costs therefore decreased by Rs. 0.11 per ton to Rs. 70.50 due to price changes. The actual price for net materials, however, in 1950 was Rs. 72.22. The difference of Rs. 1.72 represents the increase in net material costs due to increased usage of materials.

(b) *Labour*: The Tata Company's total labour bill increased by 16.1 per cent. from Rs. 566.03 lakhs in 1948 to Rs. 656.97 lakhs in 1950. This increase was caused by the usual annual increments and the institution of an incentive bonus scheme. The actual increase in total wage bill would have been even higher had not the implementation of the incentive plan succeeded in reducing the labour force appreciably. The actual labour costs per ton in the 1948 estimates were Rs. 43.87 per ton. The wage increases of 16.1 per cent. had the effect of raising labour costs by Rs. 7.06 to Rs. 50.93. The actual labour cost in 1950, however, was Rs. 45.46. An increase of Rs. 7.06 in labour costs per ton is, therefore, the price effect and a decrease of Rs. 5.47 per ton was obtained as a result of decreased usage of labour due to greater production and increased labour efficiency.

(c) *Stores*: The exact magnitude of the average price increase in stores is difficult to determine as the store account is composed of thousands of items which are used in quantities ranging from pounds to thousands of tons. The opinion of the Cost Accounts Officer, following checks of the stores accounts, is that there was an overall increase in prices of stores of the Tata Company between 1948 and 1950 of the order of magnitude of 15-20 per cent. and that, for purposes of this Report, the weighted average increase may be taken as 17.5 per cent. which is 5 per cent. less than the increase allowed to SCOB. On this basis, the effect of price increases was to raise store charges by Rs. 4.69 per ton to Rs. 31.51. As the total increase in store costs, however, was Rs. 0.81, Rs. 3.88 of the increases due to prices was offset by decreased usage.

(d) *Utilities*: Utility charges increased by Rs. 0.35 per ton in 1950. Of this amount, Rs. 0.44 resulted from higher prices due to generating more power at less efficient units and can be charged to price. Decreased usage amounted to Rs. 0.09 per ton.

(e) *Miscellaneous and Excise duty*: The increase of Rs. 0.04 in miscellaneous was due to price and the increase of Rs. 0.07 in excise duty resulted from usage due to a slightly lower yield in the rolling mills.

30. The distribution and allocation of the cost increases at Tata Company's works in 1950 are summarised below:-
Summary of reasons for increased cost.

		Price Rs.	Usage Rs.
Net materials	...	-0.11	1.72
Fuel	...	-	-0.50
Labour	...	7.06	-5.47
Stores	...	4.69	-3.88
Utilities	...	0.44	-0.09
Miscellaneous	...	0.04	-
Excise duty	...	-	0.07
	Total	<u>12.12</u>	<u>-8.15</u>
Net increase	...	<u>Rs. 3.97</u>	

The increase in 1950 works costs for the Tata Company, thus, would have been Rs. 12.12 per ton, instead of the actual increase of Rs. 3.97, had not increased costs of Rs. 12.12 caused by higher prices been offset to the extent of Rs. 8.15 by improved efficiency and the economies resulting from greater production.

31. Below is shown a comparison of calculated overall works costs increases for the two companies classified as to Price and Usage between cost increases. 1948 and 1950:-

		SCOB Rs.	TATA COMPANY Rs.
Price	...	26.00	12.12
Usage	...	18.00	-8.15
	Total	<u>44.00</u>	<u>3.97</u>

32. The preceding analysis has shown that despite an overall increase in prices of materials and labour amounting to about Rs. 12 per ton of saleable steel, the Tata Company, as a result of improved efficiency and the economies resulting from increased production, succeeded in holding down 1950 works costs increases to about Rs. per ton for products similar to those produced by SCOB and to a total of about

Rs. 6 per ton for all of its products taken together. At SCOB, the overall increase in works costs amounted to about Rs. 44 per ton or 70 per cent. more than the actual total increase in prices aggregating Rs. 26 per ton. The Tata Company, by improved efficiency and increased production, has managed to offset a large part of the price increases which it had to bear and has succeeded in holding down increases in its own works costs to about only one-third of the price increases. At SCOB, on the other hand, the works costs increased not only by the full amount of all price increases, but also by a still further increment equal to about 70 per cent. of the price increase due to increased usage and lower production. It is evident, therefore, that the variations in the actual production rates, in comparison with the Board's targets, were a major reason for the differences in the order of magnitude of the increases in costs at the two works. Accordingly, it is necessary to examine the reasons for the difference in the actual rates of production at each works.

33. The targets of production established by the Board at its previous inquiry were the production rates actually being achieved at each plant in early 1948. These targets were 87 per cent. of rated capacity for the Tata Company and 74 per cent. of capacity for SCOB. The conditions which then prevailed in the country were the limiting factor in production in general and steel production in particular and could not be ignored by the Board. Neither could the Board be expected to anticipate the direction of any changes in such conditions in subsequent years nor legitimately base its estimates of works costs and prices on such anticipations.

Very material changes have, however, taken place in India during the years under consideration. The effects of partition to a large extent have been mitigated and labour-employer relations have become more normal. Most important of all, transport, while perhaps not entirely adequate or thoroughly satisfactory in all respects, so far as steel is concerned, has very greatly improved and can no longer be considered as a deterrent to achieving capacity production in the industry.

During the intervening years, the Tata Company has succeeded in increasing its production during each period under review as shown below:-

		Rate of capacity
Board's target	681,000 tons	87 per cent.
1948-49	667,640 "	86 "
1949-50	724,199 "	93 "
1950 (April-Sept.)	750,524 " (Annual rate)	96 "
1950-51	780,000 "	100 "

It is apparent therefore that the industrial conditions during these years improved sufficiently for the Tata Company to find it possible to achieve capacity production in 1950.

The production, however, at SCOB showed a different trend as indicated below:-

		Rate of capacity
Board's target	223,170 tons	74 per cent.
1948	183,501 "	61 "
1949	224,729 "	75 "
1950 (annual rate of sample period)	195,863 "	65 "
1950	202,482 "	67 "

The decrease in SCOB's production in 1948 may have resulted from the effects of a disastrous explosion in the boiler house in April 1948 which made it impossible to operate the Bessemer unit and affected the operations of other departments for a number of months. The Board's target was slightly exceeded in 1949 although at the expense of a deterioration in yield of saleable steel.

34. During the year 1950, however, there occurred a decline in production equivalent, during the sample period, to approximately 12 per cent. decrease in and during the whole year, about 9 per cent. of the Board's target. SCOB's production in 1950. The Company was questioned at great length both during visits to the plant and at the Board's hearings as to the reasons for the decreased production. The gist of the Company's answers was that the loss in production was due entirely to a shortage of pig iron during four months of the year when one of the two blast furnaces was out of blast for relining.

The Company's contention has been carefully examined but we have arrived at the conclusion that shortage of pig iron was not a contributing factor to the Company's failure to achieve the Board's production target. It is true that during the period indicated, one blast furnace was out for relining and that the Company endeavoured to compensate somewhat for the shortage of iron at Hirapur by bringing iron to SCOB from the Kulti plant. This effort, however, according to the Company's testimony was only partly successful due to failure to produce enough iron of satisfactory quality at Kulti which generally produces iron of only foundry grade. There were other ways, however, by which the production rate of the plant might have been maintained during the temporary iron shortage - ways which are in common practice throughout the world. Blast furnaces regularly require relining and if loss of steel production is likely to occur therefrom, proper provision should be made for reserve prior to shut-

ting down the furnace or for alternate supplies of material adequate to keep the plant in operation at the maximum possible rate.

The two major ferrous raw materials used by SCOB are scrap and pig iron. The pig iron supply is dependent on Hirapur and the scrap results from SCOB's own operations. Normally, the proportions of pig iron and scrap charged at the furnaces are about 6:1. It is possible to alter the ratio over a wide range from 100 per cent. pig iron to preferably not less than 20 per cent. pig iron. Steel, however, can be made even with no pig iron. Scrap can replace hot pig iron and cold pig iron can replace both scrap and hot pig iron. It is true that production rates and conversion costs are somewhat adversely affected by large scale replacement of portions of the hot charge with a cold charge. SCOB normally operates with an average of about 12-14 per cent. cold charge. In this range, the replacement of an additional 20-30 per cent. of the hot metal with an equivalent proportion of cold charge, either scrap or pig, would not raise costs or lower production rates to any significant extent. Such increased operating costs as would result therefrom would be relatively minor in comparison with the increases in plant overheads and in conversion costs of intermediate and finishing departments as the result of failure to produce steel at the maximum possible rate. Steel mill economics are such that the most serious cost effects are those caused by failure to operate at the highest possible rate. Any reasonable price paid to achieve full production is an economy in comparison with the financial results of failing to do so.

In the calendar year 1950, there was available to SCOB from Hirapur alone a total of approximately 350,000 tons of pig iron. The use of all this metal in one form or another and the normal usage of scrap by SCOB would have resulted in the production of about 350,000 tons of ingot and about 280,000 tons of saleable steel. The amount of steel production possible from Hirapur iron production in 1950 accordingly exceeds the Board's target by approximately 57,000 tons and the actual production by about 78,000 tons. Shortage of iron production at Hirapur, therefore, was not a factor in the lower production at SCOB although availability of iron at a uniform rate throughout the year, as claimed by the Company, may or may not have been. The problem with which the company was faced in early 1950 was, in view of the likelihood of curtailment of iron supplies during the year due to the imminence of a blast furnace relining, what provisions should be made to make available adequate supplies of raw materials to permit normal production during the relining of the blast furnace.

Two separate methods, or a combination of the two, were available to the Company. The first of these was to stock cold pig iron. During the period of two blast furnace operation preceding the shutting down of one furnace for relining, very considerable quantities of iron above the deliveries to SCOB were produced at

Hirapur and sold to foundries. Sufficient quantities of the surplus iron could have been stocked and reserved for SCOB for the furnace relining period instead of being sold to outside interests. The second method would have been to conserve a supply of scrap at SCOB by replacing a portion of the normal scrap charge with hot metal during the time when hot metal was in excess and thereby accumulate excess scrap stock for use during the period of hot metal shortage. Either method would have resulted in the production of normal quantities of steel. In practice, a combination of both methods would probably have been the best procedure, but in any event, the attainment of at least the production target would have been achieved. The failure of the plant to produce 223,170 tons of saleable steel cannot, therefore, be ascribed to the reason given by the Company, viz. shortage of pig iron. Instead, the cause actually was failure to take adequate steps to provide proper quantities of raw materials for a period during which it was anticipated that normal quantities would not be available.

35. (a) As the factors which resulted in a decrease of production were within Management's share of responsibility for increases in costs, the control of management, the responsibility for that part of the increased cost which resulted from decreased production must be assigned to management. This portion, as indicated earlier, amounts to Rs. 12/- per ton and, together with the additional cost resulting from increased usage of materials due to lower yield which was caused by deterioration in technical and metallurgical practices which amounts to Rs. 6 per ton, makes a total of Rs. 18 per ton. This is the portion of the total cost increases which resulted from failure to achieve the production and usage targets set by the Board in 1948. As has been shown in the preceding paragraphs, this production rate could have been achieved by this plant had not the standard of performance and technical efficiency deteriorated, and had management taken proper steps to provide in anticipation of the shutting down of one blast furnace.

(b) The remaining portion of the total increase, viz. Rs. 26, represents the increase above the 1948 estimates which would have resulted from increased prices had the Board's targets of production and usage been realised. Examination must, however, be made of whether, as in the case of the Tata Company, the effects of these increases on works costs, could have been counterbalanced by economies resulting from increased production beyond the 1948 estimates.

Reference has been made earlier to the fact that the 1948 estimates were based on a production rate of 74 per cent. of capacity. In various statements furnished to the Board, the company has indicated that the plant as constituted since the installation of the Bessemer unit in 1946 was expected to produce about 375,000 tons of ingots which should result in the production of about

300,000 tons of saleable steel. The production of saleable steel, however, has never exceeded 225,000 tons and in 1950, during the sample period, it was at an annual rate of only 195,000 tons, and during the entire year, approximately 202,000 tons. The production of the plant during the five years since the installation of the Bessemer unit has never exceeded 75 per cent. of the plant capacity and during 1950 production declined to approximately 67 per cent. of capacity. It has been shown that the plant should have produced at least 223,000 tons in 1950 and that the reasons for the production decrease were deterioration in technical efficiency and inadequate planning. The purpose of the following paragraph will be to analyse whether the possibility of operating at a still higher rate was also within the control of management.

(c) The construction of the SCOB melting shop was begun in 1937 and initially the shop was designed to produce 250/270,000 tons of ingots. The first furnace was finished in 1939 and the second and third went into operation in August and September, 1940. The fourth furnace did not go into operation until 22nd October, 1942.

Production initially increased at a rapid and successful rate as indicated by the yearly tonnage of ingots shown below:-

1940	...	126,102
1941	...	216,003
1942	...	238,641

As the fourth furnace, the capacity of which under the then existing conditions was approximately 35/40,000 tons, was in operation for only slightly over two months of the year 1942, it is evident that within less than two full years after they were put into operation the three large furnaces were producing steel at practically 100% of the rate for which they were installed.

Despite the addition of the fourth furnace, however, production during 1943 and 1944 decreased to 217,243 and 230,703 ingot tons respectively and it was not until 1945 that the 1942 record was equalled or surpassed. In that year, 253,594 tons of ingots were produced which it is believed represents a reasonable production in the light of the then existing plant facilities and practice.

(d) In early 1946, the new Bessemer plant was put into operation which, according to the Company's statements, was installed to increase ingot production by "above" 100,000 tons. In view of the production of 253,591 ingot tons in 1945, the addition of the Bessemer unit should have increased production to at least the 1945 production plus "above 100,000" tons which would indicate that the Company expected to produce at least 360/375,000 tons of ingots thereafter.

In spite of the addition of the Bessemer plant in 1946, however, the 1945 production rate was not even equalled, let alone increased, until 1949 as indicated by the tabulation of production below:-

Tonnage of ingots

1946	...	136,051
1947	...	245,609
1948	...	219,032
1949	...	282,066

During the three years following the installation of the Bessemer, the Company experienced certain difficulties which retarded production. In 1946, there was a severe prolonged strike on the part of labour which completely disrupted plant operation during that year and its after-effects were still felt in 1947. Recovery and improvement were hampered in 1947 and 1948 by the conditions referred to earlier. During these years, the rate of steel production at the Tata Company's works was also low. In addition to the general difficulties, there was a severe boiler house explosion at IISCO in April, 1948 which prevented Bessemer operation until October and also interfered with the working of other departments.

(e) Since October, 1948, however, there have been no unusual circumstances at SCOB beyond the control of management which acted as a deterrent to the rapid realisation of the plant's capacity. The situation regarding supplies of raw materials has been satisfactory, the Hirapur furnaces have continuously produced enough iron to have produced at least 350/375,000 tons of ingots and labour has been available in overabundant quantities. Despite improvement in conditions generally in 1950, the total production of ingots at SCOB decreased to 265,452 tons, only 15,000 tons over that of 1945 without the Bessemer, and production of saleable steel decreased to 202,000 tons, that is over 20,000 tons or 9 per cent. less than the Board's 1948 estimates. In the same year, the Tata Company increased production by 100,000 tons above the Board's estimate to achieve an increase in production almost 15 per cent. greater than the Board's estimates and attain a capacity rate of operation.

During these years, plant facilities were available at SCOB for at least an equal production increase and indeed these facilities were equal to or better than corresponding facilities at the Tata Company's works which are much older and in general less modern. Raw materials could be made available at SCOB in adequate quantities. Under these conditions, it is apparent that a similar percentage increase in its production should have been attained at SCOB. Had such an increase been achieved, the 1950 production would have been about

260,000 tons of saleable steel as compared to the actual of 202,000 tons or the Board's estimate of 223,170 tons.

(f) Whether this should have been the full extent of increase in SCOB's production or not must be appraised in the light of facilities available at each plant. At the Tata Company's works, further increases in production were unattainable due to the fact that the practical production limit of the plant facilities was attained in 1950 and no greater increase could have been achieved.

At SCOB, however, a production of 260,000 tons would have represented only about 87 per cent. of capacity and the plant facilities were adequate for the production of at least another 35/40,000 tons of saleable steel. The real limiting condition at SCOB during the year 1950, however, was the Hirapur pig iron supply which was adequate only for the production of about 280,000 tons of saleable steel. The Hirapur production could have of course been supplemented by Kulti iron but as a matter of policy it is believed that the Kulti production should be reserved for foundries and accordingly not considered for SCOB's use except in cases of emergency.

(g) It has been pointed out earlier that within less than two years of the putting into operation of the original plant, the original furnaces were producing practically at capacity rate even though the plant was starting from scratch without any previous experience in steel making and even though operations were begun under the difficulties of the war period. In the light of this record, it is extremely difficult to come to any conclusion other than that in the five years from the start of Bessemer operation in 1946 to 1950 similar results should have been achieved and the full production potential realised. Even if full allowance is made for the experiences of the three abnormal years from 1946 to fall 1948, there would appear to be no good reason to believe that what had been achieved between 1940 and 1942 should not also have been achieved in a similar two-year period from 1948 to 1950, particularly since the Duplex process is only a modification in steel making practice which should not be difficult to introduce into an established plant whereas in 1940 the plant was new and without any experience at all in steel making.

(h) It would appear, therefore, as if SCOB's production for the year 1950 should have been at least 26,000 tons of saleable steel which represents what the production would have been had SCOB succeeded in achieving the same percentage increase over the 1948 estimates as did the Tata Company, and at the most 280,000 tons which represents the practical production limit imposed by the pig iron supply from Hirapur alone. The average between the two, viz. 270,000 tons, would in all fairness appear to represent the production which should have been achieved by SCOB during 1950 and that production rate will be

used as the basis of what the 1950 costs should have been in the light of the 1948 cost estimates and the factors of increased costs which were beyond the control of management.

(i) A detailed analysis of the technical and managerial measures which should be taken to achieve a satisfactory rate of production from this plant will be made in the next chapter dealing with future costs. For the purpose of this chapter, it may be stated that the poor production practice at SCOB is largely the result of poor technical and operating practices owing to an insufficient staff of competent supervisors of broad experience and in one or two instances, to employing highly skilled personnel in advisory rather than executive positions. About the middle of 1950, the company management itself had already realised the need for additional skilled supervisory and technical personnel and initiated strenuous efforts to supplement its present staff with competent foreign personnel. The recent arrival of a relatively small number of such individuals has already resulted in a major improvement in production.

36. In previous paragraphs, it has been shown that had production at SCOB Reasonable compensation for increases in works costs. in 1950 equalled the Board's target and had plant operating practices equalled those prevailing at the time of the 1948 inquiry, the works costs as determined by the Board would have increased by Rs. 26 as the result of price increases during the intervening years. Below are tabulated the breakdown of the Board's 1948 works costs estimate, the increase in each category of costs due to price increase and the works costs which would have resulted in 1950, owing to increased prices over the Board's 1948 estimates:-

Works costs per ton of saleable steel.

	Board's 1948 estimate	Increase due to price	1950 costs
	Rs.	Rs.	Rs.
Net material	99.97	7.63	107.60
Fuel	14.71	-0.48	14.23
Labour	43.54	10.01	53.55
Stores	39.59	8.91	48.50
Utilities	6.08	-0.09	5.99
Miscellaneous and Excise tax	7.86	0.64	8.50
Total	211.75	26.62	238.37

In the next chapter dealing with future costs, an analysis is presented of the bases for estimating works costs at higher production rates. The same general principles have been followed in revising the Board's 1948 works costs, as based on a production of 223,000 tons, to a production basis of 270,000 tons, simultaneously taking into consideration all price increases between 1948 and 1950. The following tabulation shows the effect of the increased production and higher prices on the Board's 1948 estimates:-

<i>Works costs per ton of saleable steel.</i>			
	<i>Board's 1948 estimates, after compensation for price increases</i>	<i>Effect of higher production rate revised to 1950 prices</i>	<i>Proper works cost 1950</i>
	Rs.	Rs.	Rs.
Net materials	107.60		107.60
Fuel	14.23	-1.42	12.81
Labour	53.55	-9.82	44.23
Stores	48.50	-4.21	44.29
Utilities	5.99	-0.27	5.72
Miscellaneous	8.50	-0.46	8.04
Total	238.87	-15.68	222.69

The above tabulation shows that had a proper rate of production been achieved by SCOB during the year 1950, the economies resulting from greater production would have offset the effects of increased prices to the extent of about Rs. 16 and have reduced the works costs of the 1948 estimates, after compensation for price increases, from Rs. 238.87 to Rs. 222.69. Approximately 62 per cent. of the total increase in works costs due to price rise could have been offset by greater production. For the Tata Company, the actual cost effect of the increase in production was to offset about 67 per cent. of the overall increase due to price increases.

The tabulation above shows that the actual works costs at SCOB in 1950, had the production rate which good technical practices would have made possible, actually been achieved, after taking into consideration all additional expenses resulting from increases in prices, should have been approximately Rs. 223. The actual works costs established by the Board's 1948 estimates upon which the present retention prices are based was approximately Rs. 212. The difference of Rs. 11 represents the increase in works costs per ton of saleable steel above the 1948 estimates which was beyond the control of an efficiently managed plant.

If Government intend to revise the retention prices for 1950 so as to compensate for such increase in works costs, compensation should be given to SCOB at the rate of Rs. 11 per ton of saleable steel sold in 1950.

For the same period, the increase in works costs for the Tata Company is Rs. 6 per ton of saleable steel as a result of cost increases beyond management's control. If it is the Government's intention to compensate the Company on this account for the calendar year only, this is the rate at which compensation should be paid to the Tata Company.

If, however, it is the Government's plan to establish new prices with effect from some date later than 1st January, 1951, the payment to the companies should be such as to compensate them for any increases in works costs during that portion of 1951 in which the new prices do not apply. In that event, the payment of Rs. 11 per ton to SCOB will continue to be proper as the works costs for the year 1951 will continue to be about the same as the adjusted works costs for 1950. As regards the Tata Company, due chiefly to the fact that production rates beyond those of 1950 are not expected to be achieved in 1951 as the plant reached capacity production in that year, works costs in 1951 will rise by about Rs. 13 per ton above the adjusted works costs, of 1950 the total increase being Rs. 19 (i.e., Rs. 6 + Rs. 13) above the Board's estimate for 1948. The Tata Company should be properly compensated for this additional increase in works costs. The weighted average increase in the Company's works costs during the calendar year 1950, and during the first half of 1951 will be about Rs. 10.3. Accordingly, if the new prices, as now appear probable, do not take effect until mid-1951, and if compensation is to be made for such increases for the entire period prior to the establishment of future prices, each company should be allowed compensation at the rate of Rs. 11 per ton for all steel sold during the period from 1st January, 1950 to the date from which new prices come into effect.

Chapter IV

FUTURE WORKS COSTS

(1951-52 to 1953-54)

37. The technical investigations required for estimation of works costs for Procedure for the years from 1951-52 to 1953-54 were carried out simultaneously with the investigation into the 1950 costs. Much of the cost analysis. data compiled during the investigation of cost increases in 1950 were equally applicable to the future. The inspection of the plant facilities with particular attention to the condition of major equipment established a standard for estimating plant capacity. Investigation of operating practices and records

formed the basis of determining whether changes in practice or improved technical efficiency might be expected to increase production rates or to reduce costs. With specific reference to the study of future costs, questions regarding the factors which limit production, expected improvements in the next two years, repair schedules for the next two years and others of a similar nature were included in the Technical Adviser's questionnaire.

Simultaneously with the studies of the Technical Adviser, the Cost Accounts Officer who advised the Technical Adviser in all matters of price, made an investigation into the current prices and price trends with particular reference to raw materials, wages of labour and stores. The companies submitted estimates of the changes in prices they expected during the year 1951-52. No attempt was made to forecast prices beyond 1951-52. Likewise, no consideration was given to future changes in wage rates due to any cause beyond 1951-52. The 1952-53 and 1953-54 cost estimates, accordingly, are based on the wage rates and prices of materials and stores which are expected to prevail in 1951-52.

The general principles used in the development of the estimates of future works costs for each company are described in the following paragraphs of this Report dealing with the determination of actual cost estimates. Detailed cost calculations for all categories of saleable steel and for coke, pig iron and steel ingots are being forwarded separately to Government as a confidential enclosure to this Report.

38. The effect on the works costs of producing steel of the actual rate of Definition of operation in relation to the plant capacity is so great, as has plant capacity. been shown in the analysis of the works costs for 1950 in Chapter III, that a clear concept of the term "capacity" in steel plant terminology is required in order to appraise works costs properly. The term "capacity" does not mean the maximum historic production rate even though such rates may have been achieved over a relatively long period of time such as a year or so. The better term for this rate is "record". It is not unusual under the fortuitous or special circumstances for a particular steel plant to operate at 105 or even 110 per cent. of capacity for considerable periods. Recently, it was announced that the entire steel industry of the United States was currently operating at a rate slightly over 103 per cent. of capacity. Such productive rates, however, are generally accompanied by high costs and excessive wear and tear of equipment and the deterioration of facilities may even become so great as to jeopardize production at a later date. Usually, operation at a rate in excess of capacity can be justified only in periods of emergency or at times when price levels are sufficiently high to permit realization of profits adequate to offset increased costs and to permit the setting aside of very substantial reserves to meet the future costs of prematurely replacing equipment whose life has been shortened thereby.

The term "capacity" as used in the steel industry generally and in this report specifically, denotes the production which can reasonably be expected continuously, under normal circumstances, from the facilities of a well-managed plant, operated in an efficient manner so as to manufacture its products at reasonable costs, with a proper allowance for non-productive time to permit maintaining those facilities in satisfactory condition. By a combination of fortuitous circumstances, it might become possible for a well-managed plant to operate at a rate of 105 per cent. of "capacity" without permanent deterioration of equipment; on the other hand, any unusual unfortunate circumstance, such as the breakdown of a major piece of equipment, derangement of transport or minor labour incidents, would make the realisation of capacity production as here defined extremely difficult, if not impossible.

39. (a) *Re-appraisal of estimate* : In Chapter III, the capacity of SCOB for the purpose of 1950 cost calculations was taken as 375,000 tons of ingots, equivalent to about 300,000 tons of saleable steel.

SCOB's plant capacity. This estimate was reached after a careful review of the various statements furnished by the Company in the previous inquiry and during the current investigation, and while the estimate is somewhat conservative, it is considered reasonable for the plant under the conditions prevailing in 1950. For the purpose of future cost estimates, however, it is necessary to re-examine the plant's practice and facilities to determine whether there are possibilities of any increase in the plant's production beyond 375,000 ingot tons and to re-appraise the capacity estimate in the light of such examination.

(b) *The steel melting shop*: The heart of a steel plant is the steel melting shop where the raw materials, pig iron, scrap, ores, flux, etc., are gathered together and processed into the steel ingots from which the rolling mills shape the ultimate products. All other departments can be considered as merely auxiliary to the steel melting shop. It is the function of the preceding departments, such as the coke plant and blast furnaces, to supply raw materials to the steel melting shop. Similarly, the function of the subsequent units, viz., the rolling mills, is merely to process the products of the melting shop into the forms specified by the customer.

(c) *Size of furnaces*: The capacity of any steel melting shop is a function of the size of the individual furnace and the type of process used in the shop. The size of the individual furnace determines the furnace rating which is calculated on a uniform basis throughout the world and is simply the weight of the volume of molten metal which the furnace hearth can hold at one time. This calculation, of course, is merely a matter of arithmetic. It can generally be considered that a furnace of, say, 200 tons rating in one part of the world will also be rated similarly in any other part of the world.

(d) *Types of processes:* The other capacity factor, type of process, introduces the time element into the determination of annual capacity. There are a number of different processes for producing steel among which three may be considered important with respect to India and for the purpose of this Report. The three processes are:-

1. Straight Open Hearth.
2. Duplex - Bessemer Open Hearth.
3. Blown metal.

In each of the above processes, the Open Hearth Furnace is the unit in which the steel is ultimately produced. While there are generally some deviations in design of furnaces which are constructed specifically for one process or the other, it is possible usually to utilise an Open Hearth Furnace for anyone of the individual processes provided auxiliary facilities are adequate.

The annual production rate of a steel melting shop is determined chiefly by the process used, as the time required to produce a unit quantity of steel varies with each individual process. Process No. 1, Straight Open Hearth, requires the longest time for two reasons - (a) a large percentage of the furnace charge is made of cold scrap which requires considerable time for charging and melting, and (b) all the impurities in the pig iron must be eliminated in the Open Hearth Furnace. Process No. 2 requires the shortest amount of time as the furnace charge is composed entirely of partially refined liquid metal from the Bessemer converter, which requires little time for charging and, as little cold scrap is normally used, no time is required for charging and melting a cold portion of the charge. Process No. 3 is somewhat intermediate between the two processes mentioned above, as a relatively small amount of cold scrap, much less than normal in the Straight Open Hearth process, is charged and the major portion of the charge is composed of liquid blown metal which has already been partially refined in the Bessemer. The effect of the process time factor in determining production potential is illustrated by the following table from Koppers' Report to Government in connection with the steel expansion programme:-

*Plant required for nominal 1,000,000 (actual
1,150,000) gross tons of rolled product per year.*

	Straight Open Hearth	Duplex- Bessemer Open Hearth	Blown metal
Annual tonnage of ingots required. ..	1,440,000	1,440,000	1,440,000
Bessemer converters required. ..		3 at 40 tons	3 at 25 tons

		Straight Open Hearth	Duplex- Bessemer Open Hearth	Blown metal
Total rating Bessemer units.	..	-	120 tons	75 tons
Open Hearth furnaces required.	..	15 at 150 tons	7 at 250 tons	10 at 200 tons
Total rating Open Hearth units.	..	2,250 tons	1,750 tons	2,000 tons
Ratio of Open Hearth furnace capacity.	..	1.00	0.78	0.89
Ratio of production rate	..	1.00	1.28	1.12

The total installed open hearth capacity required by the different processes for the production of 1,440,000 tons ingot per year is indicated in the above table, as 2,250 tons for Straight Open Hearth, 1,750 tons for Duplex-Bessemer Open Hearth and 2,000 tons for the Blown metal process respectively. The time factor of the various processes, if the Open Hearth process is taken as 100, is 77.7 for Duplex and 89 for the Blown metal process. In other words, the average time of producing a unit quantity of steel by the Duplex process is approximately three-fourths of the time required by the Straight Open Hearth process. Similarly, the average time required by the Blown metal process is about seven-eighths of that required by the Straight Open Hearth process. To put the matter in another way, an Open Hearth furnace should produce about one-third more steel if the Duplex process is used instead of the Straight Open Hearth process and about one-sixth more if the Blown metal process is employed rather than the Straight Open Hearth. The time required per individual "heat" of steel in actual practice is even less in the Duplex process than indicated above due to the fact that the furnace outage time for repairs and renewals is somewhat greater in the Duplex than in the other processes. Likewise, the above calculations with respect to the Straight Open Hearth process are based on the use of an optimum ratio of pig iron to scrap and the time factor in the Straight Open Hearth process is materially increased by a change in either direction in this ratio.

(e) *Selection of suitable process:* The selection of the proper steel making process for any individual plant depends largely on the nature of the available raw material. When large quantities of scrap can be purchased from outside sources, as in most industrial countries, the Straight Open Hearth process is likely to be favoured. The quantity of scrap which can be purchased in India, however, from sources outside the plant is very small, and for practical purposes, it may be considered that only the scrap generated in the plant itself is available for steel making. In India, moreover, due to the great shortage of steel, it has been found advantageous to sell a certain proportion of the

plant scrap with the result that not over 10 to 15 per cent. of the total tonnage of ingots produced or about one-half of the actual scrap production of the plant is generally available for plant re-cycling. It is evident therefore that in India the major raw material for steel making must be fresh pig iron in which event the Open Hearth process cannot be considered as most suitable. As a result of the scrap shortage in India, after proper allowance for metallics from such sources as scrap and ores, an average of approximately one ton of pig iron is required for every ton of ingots produced. With such a high proportion of pig iron, the other two processes become much more economical than the Straight Open Hearth process, provided that pig iron of suitable analysis for use in the other processes can be produced. The utilisation of the other processes which require preliminary treatment of the pig iron in a Bessemer converter limits the pig iron analysis to relatively narrow limits with respect to manganese. Fortunately, pig iron of proper specification for preliminary blowing in the Bessemer can be made from the indigenous raw materials in India.

(f) *Process employed by the Tata Company:* Unfortunately, however, the Duplex process is not well suited for the use of scrap. Where some amounts of scrap are available, as in the instance of plant scrap generated in the rolling mills, the former normal practice, when the major portion of the plant's production was to be made by the Duplex process, was to provide additional Straight Open Hearth facilities capable of utilising the excess scrap produced in the plant. This practice is followed by Tata Company, where approximately two-thirds of the whole production is made from pig iron by the Duplex process and one-third by the Straight Open Hearth process utilising available plant scrap for about 50 per cent. of the open hearth charge.

(g) *Process adopted by SCOB:* The process originally employed by the Steel Corporation of Bengal was somewhat different from any of the above practices, resembling the Straight Open Hearth process, but representing a departure from normal practice and deviating therefrom in the use of an abnormally large amount of liquid pig iron, much beyond the range in which the Open Hearth process is considered efficient. In order to reduce the excessive time required by the nature of the charge, an active mixer was employed in which the silicon content of the pig iron was reduced somewhat so that less lime was required and less slag was produced in the open hearth furnace, thereby shortening the process time. The original pig iron specifications in the IISCO- SCOB Agreement were based on the use of this process in which a higher percentage of manganese was desired and could be successfully used, than in a process based on partial refining in the Bessemer converter. The original SCOB process was very slow and it was possible to achieve only an appreciably lower production than could have been attained with any other of the three processes.

In 1946, the Bessemer plant was installed for the purpose of increasing production by partially refining the pig iron in the converter prior to charging into the open hearth furnace. Since the installation of the Bessemer plant, all the three steel making processes referred to above, have been used by SCOB. The general practice has been to operate the small furnace on the straight open hearth process utilising thereby a large percentage of the plant production of scrap which is not sold.

The excess re-cycled plant scrap over and above that used in the small furnace is used in one of the big furnaces to produce steel by a modification of the blown metal process. The scrap available normally results in the operation of one of the big furnaces about half time on this process, the remaining big furnaces plus the excess time of the furnace using the blown metal process part time are operated by the straight Duplex method. The average practice is of course varied from time to time as necessitated by plant conditions.

(h) *Basis of estimating ingot capacity:* The capacity of the plant, accordingly, can be estimated by considering that the plant is operated on the basis of using the small furnace for the straight open hearth process, about one-sixth of the capacity of the large furnaces on the blown metal process and five-sixths on the Duplex process.

The steel melting shop at SCOB consists of three 225-ton tilting open hearth furnace and one 90-ton fixed open hearth furnace. To supplement the open hearth shop there are two 25-ton Bessemer converters. The open hearth auxiliaries can be considered as generally adequate and modern. The Bessemer plant in general is modern although not designed for maximum utilisation and unfortunately located at an appreciable distance from the Open Hearth furnace, which is a departure from normal design.

(i) *Estimates of potential capacity:* The installed capacity of the SCOB melting shop furnaces accordingly aggregates 765 tons. The annual production to be expected from the furnaces by different individual processes, provided auxiliary facilities are comparable to those proposed for the Government plant may be calculated from the figures in the tabulation given in paragraph 39(d). The total installed capacity of the SCOB furnaces is equal to 34 per cent., 43 per cent., and 38 per cent. of the open hearth furnace capacity required for the production of 1,440,000 tons of ingots in the proposed Government plant by the open hearth, Duplex and blown metal processes respectively. The annual production to be expected from the SCOB shop if operated exclusively on one type of practice is :

Straight open hearth	....	4,90,000 ingot tons.
Duplex	....	6,20,000 ingot tons.
Blown metal	....	5,47,000 ingot tons.

The expected production per year per ton of installed furnace capacity for each process as indicated in Koppers' report on the scheme of steel expansion is shown in the following tables:-

	Installed capacity.	Annual ingot production.	Annual production per ton of installed capacity.
	(Tons)	(Tons)	(Tons)
Straight Open Hearth	2,250	1,440,000	640
Duplex	1,750	1,440,000	823
Blown metal	2,000	1,440,000	720

Applying the data in the above tabulation to the actual manner in which the SCOB shop is operated, the annual production per ton of installed capacity which should be achieved by SCOB, provided auxiliary equipment is equal, is as follows:-

	Rated capacity of furnaces on each process.	Annual Production rate per ton of installed capacity.	Total production.
	(Tons)	(Tons)	(Tons)
Straight Open Hearth	90	640	58,000
Duplex	562.5	823	4,63,000
Blown metal	112.5	720	81,000
Total	765		6,02,000

The capacity of the SCOB shop using the types of processes now employed provided its auxiliaries were comparable with the plant proposed by Koppers should accordingly be 6,02,000 tons annually.

The auxiliary facilities at the SCOB shop are in general equal to those proposed by Koppers except that while the proposed Government plant like that of SCOB was to be equipped with two 25-ton Bessemer converters, in the case of the Government plant the converters were to be provided with sufficient auxiliary equipment to permit operating the vessels simultaneously. At SCOB, the plant auxiliaries are such that it is not possible to operate the converters simultaneously. Operations of the converters in the manner necessary at SCOB

tends to lower the ingot production by perhaps 5 per cent. On the other hand, the Government plant was expected to consume a higher percentage of scrap than is used at SCOB which would have had the effect of reducing production at the Government plant to about the same extent as the loss of tonnage at SCOB due to the inability to operate the Bessemer converters simultaneously.

The rated capacity of the SCOB's melting shop facilities employing the types of processes now used is accordingly close to 600,000 tons annually.

The more modern practice, however, in circumstances where steel is to be made chiefly from pig iron but scrap supplies are available and if pig iron analysis permits, is to employ the blown metal modification of the Duplex process exclusively. The main reasons for recommending this process for the Government plants were given in the Koppers report as follows:-

"In general, there is objection to the Bessemer open hearth Duplex process because of the lower quality of the steel which is produced. Some Duplex operations have claimed product with all qualities comparable to straight open hearth steel. These claims, however, are based on longer heat time with consequent lower production and are possible only with the most careful operation.

The main considerations of the necessity for using a high percentage of liquid pig iron and at the same time making best use of the plant scrap are favourable to the use of the Blown metal process. It would, of course, be possible to use the Duplex Bessemer Open Hearth and to make use of the scrap by producing a portion of the ingots in a Straight Open Hearth furnace plant. There is great advantage, however, in having one standard steel making process which will provide all the types and qualities of steel required for the rolling mills. The blown metal process undoubtedly fulfils this requirement best.... "

The same considerations apply to SCOB plant and as the blown metal process is recommended subsequently for adoption at SCOB, the final estimate of SCOB's capacity will be determined on the basis of the use of that practice exclusively.

The rating of the individual furnace proposed for the Government plant was 200 tons. The annual production expected from each furnace was 144,000 tons of ingots. The production expected per year per ton of installed capacity accordingly was 720 tons. The aggregate installed capacity of SCOB's furnaces is 765 tons, and using the production rate per ton of installed capacity used for the calculations for the Government plant, the calculated capacity of the SCOB melting shop comes to 550,800 ingot tons per year. In view of the insufficient blowing facilities at the Bessemer, this estimate may be reduced by 5 per cent. to approximately 525,000 tons which represents a reasonable capacity estimate for the SCOB melting shop when employing the Blown metal process exclusively.

40. The production possibilities at SCOB are however, not limited only by the installed steel making capacity, but also by the availability of raw materials. Raw materials for steel making at SCOB consist as a limiting factor of the excess plant scrap above that which is sold and pig iron from the Hirapur blast furnaces. In an earlier part of the Report, it has been shown that when supplemented by the normal amount of scrap supplies in India, approximately a ton of pig iron is required for the production of a ton of ingot. The maximum quantity of pig iron available to SCOB from Hirapur is 420,000 tons which has been established as the annual capacity of the blast furnaces by agreement with the Companies' representatives. The Companies' representatives and our Technical Adviser have also agreed that after selling that portion of the plant scrap which, in view of India's extreme shortage of steel, should be sold rather than re-melted, the maximum quantity of ingots which can be made from the 420,000 tons of pig iron produced at Hirapur is 440,000 tons which for the present must be considered as the production potential of SCOB. Based on rolling mill practice agreed to by the Companies' representatives and the Technical Adviser, the quantity of saleable steel which can be produced from 440,000 tons of ingots is 348,204 tons per year.

41. Steel production at SCOB might be further increased beyond the above Pig iron supply rate, by bringing in an additional supply of hot iron from the to foundries. Kulti furnaces of IISCO which are about eight miles distant and connected to Hirapur and SCOB by a private railway line. This has been done as an emergency measure on a number of occasions during the past two years when SCOB, for one reason or another, was short of iron. As has been shown, however, the production of 440,000 ingot tons at SCOB will consume the entire iron production of the Hirapur furnaces which have been hitherto supplying 150/175,000 tons of iron to the Indian foundries yearly. When SCOB attains the production target, no iron from Hirapur will be available to the foundries. The Tata Company generally has a small amount of perhaps 50/60,000 tons of surplus iron annually for sale but does not produce iron of foundry grades and the supplies from the Tata Company are erratic and depend entirely upon the Company's steel operations. The Tata Company, accordingly, cannot be considered as a normal supplier of pig iron to the foundries. Therefore, when SCOB reaches the production goal of 440,000 ingot tons, the Kulti furnaces will be the sole regular suppliers of iron to the Indian foundries. These foundries now have a proven demand for at least 400,000 tons of iron, even when operating at the current low rate. The potential demand of established foundries is of the order of at least 600,000 tons. The Kulti furnaces cannot be expected to produce more than 200/225,000 tons of iron suitable for foundry use. It is apparent that, even

though the full production of Kulti is reserved for the foundries, the Kulti production of iron of foundry grades will not permit operation of the Indian foundries at more than 50 per cent. of their already low rate. The situation with respect to the general foundry industry is even more critical as the foundries of IISCO alone consume approximately 100,000 tons with the result that only the balance of about 100,000 tons will be available to the general trade, the operations of which will be reduced, accordingly, to one-third or less of their present rate. In view of the already drastic threat to foundry operations, which are essential to many basic industries and to agriculture, we consider that the situation should not be allowed to become even more critical by taking iron from Kulti for steel making at SCOB, except in very unusual and abnormal circumstances. There is, accordingly, little likelihood of steel production at SCOB beyond 440,000 ingot tons until the pig iron producing facilities of the country are augmented.

42. The attainment of a 440,000 ingot ton rate of production at SCOB will, however, entail a number of changes at both IISCO and SCOB, as
 Essential changes at IISCO & SCOB. compared with the situation in 1950. These changes which are of an organizational, personnel, and practice nature, will not require any major additional equipment or capital expenditure and only involve the minor installations of additional supplementary fuel supply at the steel melting shop and additional control equipment at the Bessemer. The production target is expected to be achieved essentially from the existing plant without the benefit of any of the facilities to be provided under SCOB's expansion plan which in any event is unlikely to be completed before late 1953-54. The main changes which have to be carried out in order to attain the production target of 440,000 tons of ingots were thoroughly discussed by the Technical Adviser with the Company's representatives during his visits to Burnpur and Calcutta in January-February and are briefly outlined in the following paragraphs.

43. (a) *The necessity of integration:* In the preceding chapter dealing with the 1950 costs, reference was made to the difficulties in maintaining a proper community of interest between IISCO and SCOB under the terms of the IISCO-SCOB Agreement. The Board had already recognised this difficulty and its 1948 Report recommended that the possibility of integrating the two plants through amalgamation should be examined at an early date. In 1950, the Company's management took certain steps to integrate the two works operationally. It is important, however, that integration, to the extent at least that Hirapur be operated primarily in the best interests of SCOB, should be actually achieved. Without such integration, proper performance may be difficult of attainment at SCOB.

Operational integration of IISCO's Hirapur works and SCOB's steel works.

(b) *The object of IISCO - SCOB Agreement:* At the time of the founding of SCOB, there was little real need for integration and the provisions in the IISCO-SCOB Agreement were of material advantage to both parties. At that time, IISCO had a potential pig iron producing capacity of about 700,000 tons of which not more than perhaps 3/400,000 tons could be absorbed by the Indian foundry market. If the Company's facilities were to operate at a satisfactory rate, about half of the production or about 300,000 tons, had to be sold in the export market. The Company, therefore, was substantially dependent on the export market with all its vagaries and vicissitudes. The organization of SCOB gave IISCO a permanent steady customer for at least 250,000 tons or perhaps 40 per cent. of its normal production. The sale of this amount of iron to SCOB plus the normal sales to Indian foundries assured IISCO of a market for its iron adequate to permit a rate of operation of its facilities which would ensure a profit to the Company and remove its dependence on export. In addition, the type of iron required by the original steel making process at SCOB was quite similar to the iron desired both by the Indian foundries and the export trade and, accordingly, SCOB's requirements originally fitted right into the production practices and schedules at IISCO.

(c) *Financial arrangements under the IISCO-SCOB Agreement:* The financial arrangements under this Agreement were fair to both companies. IISCO agreed to base its price for pig iron and service on two factors: (1) cost of production of iron at Hirapur and (2) profits of SCOB. Of the above two sources of income to IISCO, the payments under the first tend to be relatively fixed. The payments to IISCO under this head are composed of interest on debentures, depreciation at 5 per cent. on depreciated value of the portion of the plant engaged to produce iron for SCOB and 5 per cent. surcharge in addition to the actual works costs of pig iron production. The current total return to IISCO from this source represents only about 15 per cent. of pig iron production costs and are reduced to about 12 per cent. net after IISCO pays debenture interest. This is considerably less than the gross return from pig iron sales to foundries, and after proper allowances are made for overheads, including normal depreciation, represents no real profit to IISCO.

In order to make supply of iron to SCOB financially attractive and profitable to IISCO, a second source of income was provided, viz., 20 per cent. share in SCOB's profits. In view of the market for steel in India and steel pricing policies prevailing at the time of SCOB's formation, it was evident that substantial profits might be made by a new steel plant and that a share of such profits plus the assurance of a firm market would be an adequate and profitable reward for IISCO.

(d) *Post-war changes in IISCO's relative profit position:* Two post-war factors have, however, entirely changed the profit position of IISCO with respect to SCOB. The first of these was the decision to increase SCOB's production by above 100,000 ingot tons by the installation of the Bessemer unit and the adoption of some form of the Duplex process. This decision created two problems for IISCO: (1) the possibility of a reduction of at least 100/125,000 tons in its sales of iron to foundries; and (2) a change in the type of iron required by SCOB. The effects of these changes cannot, however, be analysed without simultaneous consideration of the other major post-war change - the establishment of controlled steel prices based in part on the principle of limiting profits.

IISCO's income from pig iron produced at Hirapur comes from two sources: (1) sales to SCOB and (2) sales to foundries. The amount of income received from SCOB, as has been shown, is governed by the IISCO-SCOB Agreement, under the terms of which substantial profits must be made by SCOB in order that IISCO's share is sufficient to provide adequate compensation. SCOB's post-war profits, however, have been limited by controlled prices which in turn are established with the purpose of limiting profits to 8 per cent. of the block. IISCO's share of SCOB's profits, accordingly, are restricted to 2 per cent. of SCOB's block which represents a return of about Rs. 15 lakhs a year to IISCO from this source. On an annual production of about 420,000 tons of iron at Hirapur, the profit realised from IISCO's share of SCOB's profits, assuming that all iron were to be taken by SCOB, is limited to somewhat less than Rs. 4.0 per ton. The realization by IISCO, above works costs, from the surcharge payment by SCOB, amounts to about Rs. 9.0. After payment of debenture interest by IISCO, IISCO's total realization above works costs as a result of payments by SCOB for pig iron, accordingly, aggregates about Rs. 11.5 per ton of iron. This is not sufficient after payment of overheads and allowances for depreciation, to provide reasonable profits for IISCO.

Foundry iron prices on the other hand are such that the income to Hirapur above works costs, may amount to as much as Rs. 25 per ton or over twice that from iron sold to SCOB. Inasmuch as the overhead charges are the same in each instance, the profits, after overheads, to be made from foundry iron are attractive whereas, in the case of iron sold to SCOB, under present steel pricing policy and after payment of overheads, the profit margin to IISCO is small and inadequate. In order to make adequate profits on its Hirapur investment, IISCO must operate the furnaces in such a manner that all iron beyond that taken by SCOB will be of such grades that it will be in demand at a good price by the foundries. Production simultaneously at Hirapur of the most desirable grades of foundry iron and iron most suited to SCOB's operations, is not possible.

While there is no evidence that IISCO has ever caused SCOB to be short of iron, it is very certain that the manner of operating the furnaces at SCOB, as will be shown from the technical point of view in later paragraphs, must be changed if SCOB is to achieve its new production target. The attainment of these goals necessitates that all of Hirapur's iron should be of suitable quality for SCOB and that the production of iron for sale to foundries must not be a determinant in policy decisions regarding furnace operations at Hirapur.

(e) *The Hirapur plant to become solely an auxiliary of SCOB:* To attain the production goals agreed upon by the Company's representatives and the Technical Adviser, all of Hirapur's production must be taken by SCOB so that the Hirapur plant will become solely an auxiliary of SCOB. It is extremely difficult to do this while serving simultaneously another master whose interests are different. The only real solution to the situation is complete integration of both works.

No allowance has been made in our estimates for the appreciable economies in works costs which should result from complete, that is, financial as well as operational, integration of these works. Such integration should result in elimination of much of the duplication in functions which now exists. Savings of a not inconsiderable degree should be effected in costs of general works management and staff organisations, such as accounting, industrial relations, engineering, etc. A common maintenance department should effect substantial savings in maintenance labour forces, and costs of separate service facilities, such as traffic, laboratories, etc., should also decrease. In calculating future production costs, no credits have been taken for such economies as we consider that any such savings should be expended in enlarging the various staff and technical facilities and securing the highest grade of personnel therefor.

The representatives of the Company appeared to be in general agreement with the Board's and the Technical Adviser's views on the question of integration. They stated, however, that there were very real difficulties in the way of achieving financial integration as such integration was not a matter within the powers of the Company's Management, but must be decided by the shareholders of both the Companies.

44. In view of the difficulties of achieving financial integration in the near future, the Company's representatives themselves have prepared a plan for the achievement of operational integration of the two works and have already taken certain steps towards the implementation of this plan. The scheme provides for unification of the two plants from the operational point of view with both plants under one common general operational staff headed by a General Manager, Assistant General Manager and General Superintendents whose authority will apply equally

Company's plans
for operational
integration.

to both works. The plan, likewise, envisages common staff departments such as engineering, labour relations, etc., and common direction of the maintenance organisations of both works. In the absence of complete financial integration, we consider that the scheme for the operational integration presents great advantages and is as far in this direction as the Company's management can go.

The Company began to take some steps to implement the new plan for unified operation in 1950 and has made a certain amount of progress therein. Unfortunately, however, it has experienced considerable difficulties and disappointments in its efforts to secure the services of personnel competent to fill the vacant posts in the new organisational set-up. Recently, however, the Company has had some success in these efforts and it is hoped that appreciable results will be achieved following the appointment of new personnel to the various posts.

45. The blast furnaces at Hirapur should be operated in such a fashion that the entire production of the works will be of suitable grade for efficient utilisation by SCOB. Reference has been made in earlier paragraphs to the Hirapur Management's responsibility to IISCO shareholders to operate the plant in such manner that the maximum amount of iron not taken by SCOB will be suitable for sale to foundries at the highest possible price. Whether or not this has been a reason, the manner of operating the Hirapur blast furnaces since the installation of the Bessemer plant at SCOB in 1946 has not been such as to make all the iron production suitable in analysis for SCOB's use. The Straight Open Hearth furnace originally used at SCOB functions best with iron of a manganese content between, say 1 and 2 per cent. For use in the Bessemer converter, however, the manganese content of the iron should not exceed 0.65 per cent. and iron of a higher manganese can be used only with great difficulty, if at all. In the case of the Open Hearth process, any deficiency in manganese content of the pig iron can be made up, however, without great difficulty, by charging manganese ore. In the instance of the Bessemer, if there is excess manganese in the pig iron, Bessemer operations and steel production suffer. Successful operation of the SCOB plant depends on putting at least 80 per cent. of the entire pig iron consumption through the Bessemer unit. Accordingly, at least 80 per cent. of SCOB's iron supplies should be of Bessemer quality. It is immaterial whether the remaining 20 per cent. is of Bessemer or open hearth grade since either can be used in the open hearth process. As there are only two individual blast furnaces at Hirapur, it is evident that the production of 80 per cent. of the total pig iron to Bessemer specification cannot be achieved from one furnace alone and that both furnaces must be operated to produce this grade at least 80 per cent. of the time. Changes in the grades of pig iron which blast furnaces may be called upon to make, as a rule, adversely affect the operation of the furnaces to some degree

at least and should be held to a very minimum. As the Bessemer grade of iron can be used in the open hearth process whereas the basic grade can be used only with great difficulty, if at all, in the Bessemer, it is desirable that both furnaces at Hirapur should be operated to produce iron of only Bessemer grade. This practice is followed at the Tata Company where despite the fact that greater flexibility is possible due to the fact that there are five blast furnaces instead of two as at Hirapur, and further that by the nature of the plant approximately one-third of the steel must be made by the straight open hearth process and two-thirds by the Duplex process, the blast furnaces which are utilised to produce iron for steel-making purposes are operated for the production of pig iron of low manganese content only and no iron of high manganese content is produced for steel making. For one reason or another, however, the practice at Hirapur has been to operate one of the blast furnaces on iron of low manganese and the other on iron of high manganese specification with the result that on the whole the production is approximately 50 per cent. of low and 50 per cent. of high manganese grades respectively. The low manganese iron, of course, is suitable for SCOB's Bessemer operation and the entire production of this grade can be taken by SCOB. The remaining 50 per cent. of the iron, however, viz., that with high manganese, is suitable only for use in the straight open hearth process or in very limited quantities as "kickers" in the blown metal process. As has been stated previously, since the installation of the Bessemer unit, the attainment of satisfactory production by SCOB requires that at least 80 per cent. of the iron consumed at SCOB be suitable for Bessemer use. As the practice at Hirapur has been to produce only about 50 per cent. of the iron to the Bessemer specification, it is evident that the production target cannot be achieved at SCOB without a change in the manner of operating the Hirapur blast furnaces. The most desirable specification ranges for a single grade of iron suitable for SCOB's plant are: silicon 1.25 to 1.75 per cent; manganese 0.50 to 0.65 per cent. and sulphur 0.050 per cent. maximum. It is recommended, accordingly, that both the Hirapur furnaces be operated to produce this type of iron alone. During the interim period, until SCOB attains a production rate at which it will consume all the Hirapur production, grades of iron useful, if not the most desirable, can be made available to the foundries, by careful selection of the particular casts of excess iron which are to be pigged for sale.

A second change which should be made in the Hirapur furnace operating practice is to discontinue the practice of changing the furnace burden to produce foundry grades of iron over the week-end when the SCOB melting shop is shut down. This practice results from the fact that due to the fuel situation at SCOB the open hearth furnaces are normally shut down for at least two turns over the week-end, and iron is not required during the shut-down period by the open hearth furnaces.

In a later paragraph, a recommendation is made which will eliminate the necessity for week-end shut-downs of the steel melting shop and thereby make it possible for the pig iron demand at SCOB to be maintained at the normal week-day rate over the week-end. Even at the present time, however, there is no need of curtailing the deliveries of iron to SCOB during the open hearth week-end shut-down. The SCOB melting shop is provided with mixer capacity adequate to hold 1500 tons of molten iron at one time. This quantity of iron is in excess of 24 hours' normal production at Hirapur. The chief purpose of the mixers is to act as a reservoir between the blast furnaces and the steel melting shop and to compensate thereby for irregularities in deliveries of pig iron from the blast furnaces and irregularities in the rate of consumption of iron by the melting shop. Even though the open hearth furnaces have to be shut down over the week-end, regulation of the quantity of the iron in the mixer with the aim of having small stocks of metal therein at the beginning of the week-end shut-down will make it possible, by filling the mixers during the shut-down period for SCOB to continue to absorb iron during the week-end at normal week-day rates. Storing of the week-end production at Hirapur in the mixer until resumption of steel-making operations will avoid the periodic week-end disturbances to blast furnace operations and pig iron analysis which result from the policy of changing the blast furnace burden over the week-end to produce foundry instead of steel-making iron.

46. The installation of the Bessemer in 1946 and the adoption of some form of duplexing as the major process at SCOB introduced new and to some extent radical practices at the melting shop, which necessitated proper training of the operating personnel in such techniques. At this late date, it is impossible to assess the measures taken by the Company in the past to give such training. It is apparent, however, that further training of the melting shop personnel and strengthening of the higher supervisory staff are needed.

The Technical Adviser, after thoroughly discussing the subject with the Company's representatives and at their request, furnished a memorandum specifying what additional personnel was required and the salaries which such personnel would have to be paid if secured from foreign countries.

During the period 1948-1950, the Company lost a number of its key personnel and according to statements of the Company's representatives considerable difficulty has been experienced in securing both replacements and the supplementary personnel required to fill new posts in the organisation created by the scheme for operational integration. During the past several months, however, a number of new senior staff has been engaged and their efforts have already resulted in improved operations.

47. The fuel supply for the SCOB open hearth furnaces is producer gas which Provision is made in a battery of 7 gas producers. The gas producers are all for supplementary fuel connected into a common main from which the fuel supply for each individual furnace is drawn. This type of arrangement necessitates cutting off the producer gas from all furnaces at any time when any individual producer or main is being cleaned and, in the absence of satisfactory supplementary fuel to replace the producer gas, entails a stoppage of furnace operation. The producer gas practice at SCOB is such that the mains and producers require cleaning once every week. As a result, all the open hearth furnaces are shut down for at least two turns out of the total of 21 turns during the week which causes a complete loss of production during this time equivalent to almost 10 per cent. of the plant capacity.

It has been also stated by the Company's representatives that the total output of gas from the producers is insufficient to permit simultaneous operation of all the four furnaces at normal rates, and accordingly, it is seldom that more than three of the four furnaces are operated at any one time due to shortage of fuel. The gas producers are operated at only about 75 per cent. of rated capacity, the gasification rate per producer being only about $2 \frac{1}{3}$ tons of coal per hour in comparison with a rated capacity of 3 tons. It is estimated that approximately 15 to 20 per cent. of the production potential of the shop is being lost due to insufficiency of fuel.

The immediate remedy for this situation which should result in increasing production by at least 15 per cent. is the provision of a supplementary source of fuel to augment the producer gas when additional fuel is needed or when the producers are shut down. The Technical Adviser suggests that this should be done with coke oven gas and coal tar. The open hearth shop is already provided with a supply of coke oven gas which can be utilised almost immediately by the open hearth furnaces. Coke oven gas is available in adequate quantities for this purpose and if additional amounts are needed the supply of coke oven gas can be increased by using surplus blast furnace gas to under-fire ovens which are now under-fired with coke oven gas. The use of coke oven gas alone may not be entirely satisfactory due to the low luminosity of its flame. To remedy this defect, the coke oven gas should be supplemented with coal-tar fired through burners which should be installed at the ends of the open hearth furnaces.

One reason for the apparent insufficiency of gas supplies is the abnormally high consumption of fuel per ton of ingot. The present consumption of fuel per ton of ingots amounts to the equivalent of about 750 lbs. of coal. The Company's representatives and the Technical Adviser have agreed that when capacity operation is reached, the fuel consumption should not exceed 480 lbs. of coal. At this rate of fuel consumption, the total quantity of fuel now being

consumed by the furnaces would be adequate for the production of almost 50 per cent. more steel than is now being produced. Operation of the producers at rated capacity would provide approximately 30 per cent. more gas than is now being made. The operation of the producers at the rated capacity, plus reduction in fuel consumption to the agreed figure, will probably eliminate any necessity for use of supplementary fuel at any time except when the producers were shut down for cleaning.

The fact that the producers cannot operate at rated capacity and stay in operation without cleaning for longer periods than one week indicates that a serious study should be made for the purpose of determining the reasons therefor. The Company's representatives state that the poor operation is caused by "slagging". This would indicate the use of unsuitable coal. There are many coals in India with a sufficiently high ash fusion temperature to avoid slagging troubles in producers. In the opinion of the Technical Adviser, the trouble is much more apt to result from 'coking' which would also indicate the likelihood of the use of unsuitable coal. The Tata Company's open hearths are likewise fired with producer gas and no difficulty is encountered in operating the producers at the full rated capacity and cleaning is required only once every three weeks. There is no reason to believe that similar results with reference to operating rate and shut-downs for cleaning cannot be achieved at SCOB. A comprehensive study of the properties of the coal now used and also of the producer practice should reveal the causes of these difficulties and indicate the remedies therefor.

48. Periodic shut-downs of open hearth furnaces are necessary for rebuilding and repairs. In normal practice, the percentage of "outage" time for repairs and rebuilding ranges between 10 and 20 per cent. varying with the type of furnace, melting practice, nature of raw materials, types of fuel, etc. At SCOB, the loss in productive time due to repairs and rebuilding averages about 35 per cent. This is much too high and should be reduced to about 20 per cent. The extent of loss in production from this cause is of the order of 15 per cent. of the plant capacity and totals perhaps 75,000 tons of ingots annually. At the Tata Company, the outage time for repairs and renewals at the duplex shop totals only 16 per cent.

There appear to be at least three major reasons for the excessive percentage of repair time at SCOB. They are:-

- (a) Short furnace life;
- (b) Excessive regenerator repairs; and
- (c) Poor refractory and brick practice.

(a) The remedy for short furnace life is improvement in furnace operating practice and to some extent probably improved refractory techniques.

(b) The cure for this item requires detailed study to determine first the causes for the excessive amount of regenerator repair which may be a matter of design, refractories, fuel utilization or operating practice. The causes of the present practice of completely replacing the regenerator checker work at each furnace repair period must be determined as this item results not only in excessive loss of production but also in very high rebuilding costs. The Tata Company makes a complete checker replacement only every several years whereas at SCOB, full replacement of the checkers is required every several months. The cost of a complete checker replacement may be as much as Rs. 150/200,000 which becomes a major expense in Open Hearth costs when such replacements must be made too frequently.

(c) The remedy for this item is largely a matter of personnel. An improved brick mason and refractory organization must be developed. The former brick superintendent resigned some time ago since which time this post has been vacant. It is understood that a competent successor has been engaged and is due to arrive at an early date. His efforts should result in material improvement in brick and refractory practice.

49. The advantages of the blown metal process have been described in an earlier paragraph. At SCOB particularly, the adoption of the blown metal process as one standard method of steel making rather than the three different methods in use at present should make the problem of training personnel easier and its solution more rapid.

50. The present Bessemer plant is provided with two vessels but with only one blower to supply the air to the vessels. The capacity of the blower is, however, sufficient only for the operation of one vessel at a time. The control system is such that the air supply cannot be quickly switched over from one vessel to the other. The result is that only one vessel is being operated most of the time, while the other remains as a stand-by for use only during repairs of the first vessel. The cycle of Bessemer operation is such that an appreciable portion of the total process time is required for charging the vessel with iron and emptying the vessel of the resulting blown metal. A large part of the charging and emptying time may be saved in a two-vessel shop by blowing the vessels alternatively, in what is known in steel plant terminology as "one up - one down" fashion. In this practice, during the period when one vessel is on the "Blowing" part of the cycle, the second vessel is being emptied of its contents and filled with fresh pig iron and made ready for the next blow. As soon as the blowing in the first vessel is finished, the blast is taken off the vessel and put on the second which is waiting already filled with its pig iron charge. The second vessel is then placed in operation while the first is being emptied and re-charged. Operation of the Bessemer plant

in this manner would reduce the Open Hearth charging time to such an extent that a production gain of probably 5 per cent. should be achieved in the open hearth.

51. The charging practice at the Open Hearth is to charge blown metal in units of sixty tons composed of three 20-ton blows which are emptied at the Bessemer into one ladle for transfer to the open hearth. This practice results in at least three hours being required to charge a furnace and also results in holding the blown metal in the ladle when it had better been in the furnace. Charging the Bessemer to its rating of 25 tons would require only 8-9 blows instead of the 10-11 required for a furnace charge with consequent reduction in the open hearth charging and heat time and increase in the production rates. The unit charge for the Open Hearth furnaces should also be reduced to 50 tons composed of two 25-ton blows which will reduce the time the metal is held in the transfer ladle where no work is done and thereby make the metal available to the furnace, where the work is done sooner.

52. During the Technical Adviser's visits to Burnpur and Calcutta, he had detailed discussions with the Company's management regarding the necessary improvements, as indicated above. He was, however, informed that a number of these matters had been already under the consideration of the Company and that certain steps were being taken to implement them.

The Company's representatives agreed that, as a result of the implementation of the schemes mentioned above, the production to be expected in the future, as limited by the availability of iron from the Hirapur furnaces, should be taken at 440,000 tons of ingots, equivalent to 348,204 tons of saleable steel. It was also agreed that this production should be achieved by 1953. There were prolonged discussions as to what production should be expected in 1951 and 1952. It will be realised that of all the above recommendations, the key recommendation with regard to the operation of the plant is that in regard to the procurement of additional competent technical and supervisory staff. Once such help is obtained, it is certain that the basic recommendations of the Technical Adviser on modifications thereof as well as many other improvements in practice will be adopted and properly executed.

The Company began its efforts to engage additional personnel as early as in the autumn of 1950 at which time the Technical Adviser happened to meet the Company's Consultant who was then visiting the United States and endeavouring to obtain the services of American experts for SCOB. The Company's Consultant stated at that time that he was encountering serious difficulties in his negotiations with a number of individuals and that many of these negotiations had failed completely. In view of such difficulties, the Technical Adviser agreed with the Company's representatives in the earlier stages of the investigations

that the tonnage of ingots to be produced each calendar year, for the purpose of cost estimates, should be taken as follows:-

1951	...	320,000 tons
1952	...	375,000 tons
1953	...	440,000 tons

At a somewhat later stage of the inquiry, in view of the likelihood that any change in future retention prices would not take effect, at any rate, until 1st May, 1951, the basis for the estimation of tonnage was changed from the calendar year to the 12 months period from 1st May to 30th April. The previous production targets for the various calendar years were adopted as the basis for adjusting the production estimates to the new costing periods. The revised estimates are as follows:-

1951-52 (1st May-30th April)	...	338,333 ingot tons
1952-53 (-do-)	...	396,667 -do-
1953-54 (-do-)	...	440,000 -do-

and the tonnages of saleable steel to be produced therefrom are:-

1951-52	...	263,127 tons
1952-53	...	311,454 tons
1953-54	...	348,204 tons

The Technical Adviser and the Cost Accounts Officer, accordingly, developed works costs for each of the three years based on production of the above quantities of steel. The summary of the estimates of works costs for each year is shown in statement No. II below:- (Statement No. II on next page)

53. (a) *Modifications in the basis of estimating works costs:-* One very fundamental change from past practice was made in the basis for estimation of works costs for the future. Actual practice under the IISCO-SCOB Agreement is to charge pig iron to the steel melting shop at the prices paid for the iron. As this practice introduces an "inter-company" charge into works costs at an intermediate stage, the records of works costs of SCOB are not comparable with those of integrated plant and comparison with the costs records of the other major producer is rendered difficult. Works costs and overheads are mixed up and confused as the price paid to IISCO includes certain items of overheads in addition to the works costs. Accordingly, it was decided, for the purpose of the present inquiry, to eliminate from SCOB's works costs all charges for pig iron except the actual production cost at Hirapur, thereby making possible the calculation of SCOB's works costs on the basis that the two plants were completely integrated. The pig iron surcharges under the IISCO-SCOB Agreement, and inter-company profits and head office charges have been treated as items of overhead and proper compensation for these items has been allowed in establishing SCOB's overheads.

STATEMENT SHOWING THE ESTIMATES OF WORKS COST OF BILLETS & OTHER CATEGORIES OF STEEL

Period		1951-52			1952-53			1953-54			
Particulars	Production	Works cost	Total cost	Rs.	Production	Works cost	Total cost	Rs.	Production	Works cost	Total cost
	Tons	per ton	(In lakhs)		Tons	per ton	(in lakhs)		Tons	per ton	(in lakhs)
1. Blooms .....	...	...	...		8,258	137.57	11.361		24,775	130.79	32.403
2. Billets	56,599	170.10	96.275		74,059	160.31	118.726		82,581	153.74	126.958
3. Heavy Rails ...	20,000	173.97	34.794		20,000	162.63	32.536		20,000	159.19	31.838
4. Structural.....	66,721	179.31	119.635		94,167	170.22	143.273		92,545	163.81	151.595
5. Light Bars	28,539	182.42	52.061		20,282	174.58	51.121		29,282	169.56	49.651
6. Light Rails....	3,323	198.29	6.889		3,409	189.88	6.473		3,409	187.16	6.380
7. Black Sheets (11-14 G)	41,333	224.51	92.797		44,667	210.44	93.897		47,000	202.04	94.959
8. Galvanized Plain Sheets (Soft). .	7,204	556.43	40.806		7,204	552.70	39.817		7,204	545.24	39.279
9. Galvanized Corru- gated Sheets (Hard)	14,408	561.23	80.862		14,408	547.63	78.903		14,408	540.20	77.832
10. Black Corrugated Sheets (Cold Rolled)	25,000	257.45	64.363		26,000	243.27	63.250		27,000	224.85	63.410
TOTAL	2,63,127	223.54	588.182		3,11,454	205.31	639.457		3,48,204	193.65	674.305

(b) *Expected reduction in costs based on higher rates of production and improvements in metallurgical practices:-* The bases of the cost estimates for the future differ in many respects from the bases on which previous costs estimates had been made due chiefly to improvements and changes in practice upon which the expectation of higher production is based. Such revisions have been made only after prolonged discussion and, in most cases, in agreement with the Company's representatives. In those relatively few instances in which there was no agreement, the opinion of the Technical Adviser was taken by the Cost Accounts Officer in setting up cost estimates.

54. The major changes in the bases for estimating costs to which the representatives of both IISCO and SCOB have agreed, are as follows:-
Changes in the bases of estimates agreed to by IISCO and SCOB.

(i) *Product mix:-* The distribution of the production of saleable steel has been made on the basis of agreement with respect to capacity of the individual mills and with due regard to types of product and present demands for various products. Production of heavy rails has been restricted to a maximum of 20,000 tons per year. The total rolling mill capacity for production of the usual grades of saleable steel is 323,429 tons and all finished products above this tonnage will be rolled into 5" x 5" blooms at the blooming mill. The Iron and Steel Controller has stated that there is an adequate market in India for such blooms.

(ii) *Hirapur Coke plant yield and production:-* The yield of total coke from the coal charged is established at 77 per cent. The total production of furnace coke is taken at 6.25 lakh tons and production of hot coke at 18,800 tons.

(iii) *Coke plant rebuilding charges:-* Provision for coke plant rebuilding charges has been fixed at Rs. 0.63 per ton of coke.

(iv) *Blast furnaces capacity:-* The rated annual capacity of the blast furnaces, after proper allowance each year for the year's proportion of periodic non-productive relining time, is established at 420,000 tons.

(v) *Relining Charges:-* Blast furnace relining charges are taken at Rs. 1.31 per ton of pig iron.

(vi) *Coke consumption:-* The coke consumption per ton of pig iron will be progressively reduced and reach the minimum estimate of 2,150 lbs. per ton in 1953-54. Nut coke will be used at the blast furnaces with the result that the consumption of coke will be 2,086 lbs. of furnace coke and 64 lbs. of nut coke per ton.

(vii) *Gas Credit:-* Gas credit is progressively increased to a total of Rs. 7.25 per ton in 1953-54.

(viii) *Blowing Costs:-* Blowing costs are taken at Rs. 3.46 per ton for each year.

(ix) *Steel melting shop*:- Yields of ingot from the metallic charge are taken as follows:-

1951-52	...	82.00 per cent.
1952-53	...	82.50 per cent.
1953-54	...	83.50 per cent.

(x) *Scrap*:- The present practice of selling those grades of scrap which can be used advantageously in India is to be continued. All excess scrap will be remelted.

(xi) *Fuel consumption*:- The fuel consumption per ton of ingots at the Open Hearth would be decreased progressively reaching a minimum of 480 lbs. of coal in 1953-54.

(xii) *Rolling Mills*:- Yields of rolled products are based on records of actual practices in 1950.

(xiii) *Stores*:- The consumption of stores will increase at the rate of $\frac{1}{2}$ per cent. increase in consumption for each 1 per cent. increase in production.

(xiv) *Labour*:- The present labour force will be more than adequate for the maximum production contemplated in this Report.

55. *Items of cost reductions not agreed to by IISCO and SCOB*:- The Companies' representatives did not agree to the following revisions:-

(i) *Gua Ore*:- Cost of Gua ore has been progressively reduced in the estimates from Rs. 7.75 per ton in 1951 to Rs. 6.75 per ton in 1953-54. The actual current cost of Gua ore is reported by the Company as Rs. 8.86 per ton. We are advised that the reported costs of Gua ore are excessive in comparison with the Tata Company's average cost of ore of Rs. 5.057 per ton and Bird's sales price of Rs. 5.581 per ton. During the course of the previous inquiry, the Company had stated that the high cost of Gua ore was due in part to the low rate of operation. Currently the production of this mine is being doubled which according to the statements of the Company's representative at the previous inquiry should lead to lower costs. It would appear from the evidence that the poor condition of much of the mine equipment has contributed to the high cost in the past. The equipment is reported to be in much better condition now as a result of an extensive repair and re-modelling programme carried out last year. The Company has also claimed that the high altitude of the mine is a factor in the high costs. The mine's situation in this respect, however, is much the same as that of the Badampahar mine of the Tata Company which produces ore at less than 2/3rd of the cost of the Gua mine. Lastly, the Company's representatives state that the efficiency of their workmen is less than that of the labour of other companies. Such a reason, however, cannot be allowed to influence consideration of costs as the securing of efficiency of labour equal to that obtained by other

companies is a problem which it is the function of management to solve in order to achieve a reduction in costs. There is every reason to believe that a reduction in the costs of Gua ore should be achieved. Accordingly the prices used in the estimates of future works costs are somewhat lower than those requested by the Company but still substantially higher than either the Tata Company's cost or Bird's sales prices for iron ore.

(11) *Rebuilding, repair and provision:-* As has been shown in the earlier parts of this Report, the present costs for these items are abnormal and excessive. Appreciable reductions have, therefore, been made in the allowance for these items, in future costs estimates. The Company's representatives agreed to the amount provided for 1951-52 but objected to any further reductions in 1952-53 and 1953-54. The amounts allowed in future cost estimates for 1952-53 and 1953-54 are, however, in no case lower, and in most cases appreciably higher, than those currently being achieved by the Tata Company and are quite liberal in comparison with the standards prevailing elsewhere in the world.

56. With the exception of the prices of Gua ore, all prices used in the future costs of estimates were established by the Cost Accounts Officer, after raw materials, consulting the Technical Adviser and with the approval of the Board. labour & stores. The basis for established prices in the major categories of purchases is as follows:-

(1) *Raw materials:*

(a) *Manganese ore, limestone and raw dolomite:-* In estimating the costs of the above raw materials for the period from 1951-52 to 1953-54, the estimated raising cost of manganese ore in 1951-52 and latest purchase rates of limestone and raw dolomite have been adopted.

(b) *Ferro-alloys and aluminium:-* The orders booked by the Company were taken into account in estimating the future costs of these raw materials. These rates were accepted by the Company.

(2) *Labour:*

The Company represented that the increase in the labour cost for IISCO and SCOBE for 1951-52 would be about 12 per cent. and 16 per cent. respectively over those of the sample periods. The Company's claim was carefully gone into and, in estimating the labour cost for 1951-52, grade increments, increase in production bonus, increase in dearness allowance, etc. have been allowed. For 1952-53 and 1953-54, provision has been made for the increase on account of production bonus only. As the company has surplus labour, it should reduce the labour force gradually within the next two years and the amount saved by the reduction in labour should be adjusted against future increments. Adequate provision for foreign technical personnel proposed to be employed by the firm in order to achieve the anticipated production, has also been made.

(3) Stores:

In regard to future costs of stores, the Company prepared a statement (taking about 600 items of stores) showing a difference of 40 per cent. between the weighted average for the sample periods and the current rates of stores, and claimed that the future costs of stores should be increased by the above percentage. As the number of items in the steel industry runs into thousands, to estimate the increase on the basis of a few selected items will not give representative figures. In the case of the Tata Company, where a large number of items was taken, the increase in stores prices was found to be about 20 per cent. against which 15 per cent. increase has been allowed on the per ton cost of stores, as the estimated production did not record much increase over the past actuals. In the case of IISCO and SCOB, the principle adopted for the Tata Company was not applied as the production estimated for the future years was much higher than the actuals during the sample periods. The stores expenditure was divided into two sub-divisions (given below) and the effect of each of these was taken into account:-

- (i) increase in stores cost due to increase in prices, and
- (ii) increase due to increased consumption as a result of higher estimated production.

For the stores prices, 20 per cent. increase on the total expenditure is allowed in 1951-52. No increase is allowed on this account in the estimates for 1952-53 and 1953-54.

For increased consumption of stores as a result of higher production, it was agreed that it would be fair to assume an increase in such quantities at 50 per cent. of the proportion in which the production increased. For example, if the production was assumed to increase by 20 per cent., the quantitative consumption of stores was assumed to increase by 10 per cent. Provision has been made for such increases in consumption in the future estimates.

(4) Spelter:

In the estimates of future costs, the spelter rate is taken at Rs. 3,500 per ton.

57. In Statement II, three separate works costs are shown which have been based on different production rates. These production rates and corresponding average works costs of saleable steel are tabulated below:-

<u>Ingot Production</u> (Tons)	<u>Saleable Steel</u> (Tons)	<u>Weighted average works costs</u> Rs. per ton.
338,333	263,127	223.54
396,667	311,454	205.31
440,000	348,204	193.65

58. In the earlier stages of the investigation, it had been our intention to base the estimates of works costs for 1951-52 on a production of 338,333 tons of ingots or 263,127 tons of saleable steel. In the meantime, however, a number of changes have taken place. Additional supervisory personnel for the steel melting shop have arrived and already introduced certain improved practices. It is also understood that steps have been taken to implement certain of the recommendations of our Technical Adviser. The result has been a greatly improved production rate as indicated below:-

		<u>Total ingot production</u>	<u>Ingots per day</u>	<u>Yearly rate</u>
		Tons	Tons	Tons
March	1951	29,289	951	347,115
April	"	32,626	1,068	397,120
May 1-15	"	16,029	1,067	389,455

The annual rate of ingot production during each of the past two and a half months has already exceeded the rate of 338,333 ingot tons originally assumed for the year 1951-52. The rate of production in April exceeded and the May 1-15 rate approached the ingot production of 396,667 tons expected for 1952-53. In view of the fact that the 396,667 ton rate is practically being achieved at the beginning of the 1951-52 period and there is every reason to expect the rate not only to continue but also to increase as further changes are put into effect both by the recently arrived and yet-to-come technical and supervisory personnel, it was decided that the works costs for the year 1951-52 should be taken as those based on a production of 396,667 tons of ingots or 311,454 tons of saleable steel.

59. With reference to works costs beyond 1951-52, the Company's representatives and the Technical Adviser have agreed that a production rate equivalent to capacity, viz., 440,000 ingot tons, should be achieved in 1953. The production rate proposed for 1951-52 is 396,667 ingot tons which represents 90 per cent. of capacity, as limited by present pig iron supplies. It cannot reasonably be expected that the last 10 per cent. increment of gain in production will be realised rapidly. To attain the last bit of potential from a steel plant which has never operated at capacity rating before is rather like "squeezing the last drop of blood out of turnip". Minor refinements in practice must be accomplished, additional bits of equipment added here and there and specifically, in this instance, the supplementary fuel system must be installed at the Open Hearths and new controls installed at the Bessemer. Minor changes in design of various facilities such as the Open Hearth regenerators may be required. Kinks and limitations which have not been evident or troublesome

at lower rates of operation will reveal themselves and must be overcome. Better quality of pig iron particularly in respect of sulphur content and regularity of analysis must be obtained and this requires improvement in the operation of the Hirapur furnaces. Accordingly, it is extremely unlikely that a sustained rate of operation much beyond a 400,000/410,000 ingot tonnage rate will be achieved in 1952-53. The works costs estimates for 1951-52 consequently should be applicable for the following year also.

During the year 1953-54, however, operation at full capacity should be achieved. The weighted average of works costs estimates at capacity operation are shown in Statement II to be Rs. 193.65 per ton of saleable steel, a decrease of Rs. 11.66 from the estimate of Rs. 205.31 at the 90 per cent. operating rate. The actual difference in costs of similar products, however, is much less as is shown in the following comparative table:-

Works costs of various categories of steel at operating rate of			
	90%	100%	Decrease
	Rs.	Rs.	Rs.
Blooms	137.57	130.79	6.78
Billets.....	160.31	153.74	6.57
Heavy rails.....	162.68	159.19	3.49
Structurals.....	170.22	163.81	6.41
Light bars.....	174.58	169.56	5.02
Light rails.....	189.88	187.16	2.72
Black sheets 11-14 G	210.44	202.04	8.40
Galvanised plain sheets (soft).....	552.70	545.24	7.46
Galvanised corrugated plain sheets (hard).....	547.63	540.20	7.43
Black corrugated sheets.....	243.27	234.85	8.43
Simple average.....			6.27

The actual decrease in cost of each category of product in comparison with the decrease in weighted average cost of all products of Rs. 11.66 is much lower and ranges from Rs. 2.72 in the case of light rails to Rs. 8.43 in the case of corrugated black sheets. The actual average decrease in works costs of similar categories is only Rs. 6.27 or approximately 3 per cent. of the total works costs. The apparent decrease in works costs indicated by the weighted average costs of all products comes as much from a change in the product mix as it does from a decrease in costs of individual specific products. Over Rs. 5.0 or about half of the decrease in weighted average works cost is caused by the fact that at capacity operation of the steel melting shop, it is not certain that the finishing mills will be able to process

all the steel into the usual grades of saleable steel. Accordingly, for the cost calculations, the excess product which amounts to 24,775 tons was assumed to be rolled into semi-finished blooms which are the cheapest of all the mill products. The large increase in the percentage of semi-finished steel in comparison with finished products distorts the weighted average works costs. It is not unlikely that the finishing mills will be able to finish all the steel produced in which case there will be little difference in works costs for 1953-54 and those of preceding years.

In view of the relatively small difference in works costs of similar products and also in view of the likelihood that it may be found possible by 1953-54 to finish the additional quantity of steel into the normal products, we propose to adopt the works costs based on a production of 396,667 ingot tons (or 311,454 tons of finished steel) as the works costs for the year 1953-54 as well as for the preceding two years.

60. (a) *Wartime performance*:- A large party of experts in every phase of steel Tata Company's plant design and operation from Koppers Company made a complete plant capacity. inspection of the facilities and practices at the Tata Iron and Steel Works on behalf of Government in 1948. Their general conclusions with respect to production capacity and operating practices at that time are summarized in the following quotation from Koppers' subsequent report to Government:-

"Here is the major iron and steel producing plant of India, most favourably situated with respect to the assembly of raw materials and the distribution of finished products to the present consuming area. A well trained operating organization has attained a background of experience which enables it to function with very little or perhaps no guidance from non-Indian technologists. During the war period 1939 to 1946, all major facilities, except the blooming mill, operated at or near their rated capacity. Because of the urgency of those years, neither time nor material were available for much needed repairs or replacements. Upon emergence from this period the plant was faced with the necessity of making abnormally heavy commitments in order to restore the physical properties to the point where production might be maintained at something near capacity. Due to the world-wide scarcity of iron and steel products, this goal has not been attained to any marked degree. Influenced somewhat, perhaps, by a universal labour unrest and re-orientation of public policy the result has been a serious deterioration in the productive output of the plant."

The Company's actual production of all grades of saleable steel during this period was as follows:-

1939-40	...	777,000 tons
1940-41	...	834,000 tons
1941-42	...	839,000 tons
1942-43	...	728,000 tons

1943-44	...	831,000 tons
1944-45	...	747,000 tons
1945-46	...	746,000 tons
Average	....	786,000 tons

The average yearly production during the war years was 786,000 tons. It will be noted that in three of these years the average rate of production was exceeded. The record production of the plant was achieved in 1941-42 when production reached a total of 838,000 tons. In 1940-41, the output of saleable steel was 834,000 tons and in 1943-44, 831,000 tons. The tonnages equal 106.7, 106.1 and 105.7 per cent. of the average production of 786,000 tons.

It is stated in the previous quotation that during the above period, "neither time nor material were available for much needed major repairs or replacements". In the light of the definition of capacity given in paragraph 38, which requires that adequate non-productive time must be allowed to keep the facilities in proper repair and in view of the extent of deterioration in plant facilities as indicated in the Koppers' Report, which resulted in part at least from lack of time for repairs, it is evident that the high production during the period from 1940-41 to 1943-44 was attained only at the expense of future production which is not in accord with the concept of "capacity" as used in the present Report. In view of this, it would appear to be reasonable to appraise the capacity of the Tata Company's plant during the war years as of the order of 775/800,000 tons of saleable steel.

(b) *Post-war capacity:-* The plant facilities, however, as stated in Koppers' Report, emerged from the war period in such a deteriorated condition as to require "abnormally heavy commitments in order to restore the physical properties to the point where production might be maintained at somewhere near capacity". The immediate post-war production potential of the plant probably did not exceed 725/740,000 tons and it will be noted that this post-war rate was not equalled until four years after the war in 1949-50. At the time of the last inquiry, it was the opinion of the Company's Management that the production of the plant in the then prevailing conditions could not exceed 681,000 tons.

Since the war, in view of greatly increased prices of steel mill equipment and lack of sufficient funds to meet the high costs of such equipment, no major replacement of facilities had taken place until the rebuilding of one of the coke oven batteries was started in 1951. No new facilities, which could contribute to the production of ingots have been installed, although a new 28" billet mill was installed in 1949 which will relieve some of the congestion at the old continuous billet mill which tended to hold up blooming mill operations.

The productive capacity of the plant has, however, been restored to some extent by a programme of major repairs of those units which had suffered the most

serious deterioration and are most vital to continued operation, such as the coke plant, steel melting shop No. 1 and the blooming mill. To a great extent, however, the nature of the programme was such that sustained improvement, beyond a period of a few years, could not be expected, as the programme was not one of fundamental replacement but rather of merely major temporary repairs. The immediate effect of the repair programme was such that, with the aid of an excellent incentive plan designed to stimulate production, it was possible to produce about 780,000 tons of saleable steel in 1950-51.

(c) *Capacity of steel melting shops:-* In an earlier part of this Report, it was stated that the basic unit by which the production potential of a steel plant must be judged is the steel melting department. The Tata Company's steel melting department is composed of the following four units:-

- (1) Steel Melting Shop No. 1
- (2) Steel Melting Shop No. 2
- (3) Steel Melting Shop No. 3
- (4) Electric Furnace Plant.

Of the above units, steel melting shop No. 3 and the electric furnace plant are not of great importance in an appraisal of capacity as they are relatively small speciality units whose production rate depends on demands for the specialized products for which they produced steel. The annual production to be expected from these two units may be taken at 85,000 tons.

Steel melting shop No. 2 is a well-designed unit for the production of steel by the Duplex method. It is equipped with two 250-ton and one 200-ton open hearth furnaces. The installed open hearth capacity of the shop is accordingly 700 tons. The open hearth furnaces are served by three 25-ton Bessemer converters. Although 25 years old, the facilities at this unit have been in good repair.

The normal capacity of the open hearth furnaces at No. 2 melting shop may be calculated from the data given in paragraph 39(1), which indicates that 823 tons of ingots should be produced per year per ton of installed open hearth capacity by the use of Duplex process. The 700 tons of installed furnace capacity, accordingly, should produce approximately 576,000 tons of ingots. The Tata Company's furnaces, however, are served by an excellent Bessemer department of larger capacity than was contemplated for the proposed Government plants of half million tons of saleable steel. The additional Bessemer facilities make possible the production of about one-eighth more steel from the open hearth furnace, in view of which the capacity of this shop has been established as 650,000 tons of ingots, operation at which rate has been taken as the basis of cost calculations for this department for the years from 1951-52 to 1953-54.

The production potential of the remaining melting shop No. 1, is rather more difficult to appraise as the shop is old, obsolete and provided with inadequate and worn-out auxiliaries, the replacement of which in view of the shop's obsolescence is not economically sound. The shop is a development of the original steel making facilities which were built in 1911 and subsequently enlarged and somewhat improved in the period between 1911 and 1926. The melting equipment consists of eight furnaces ranging in size from 72 to 130 tons which use the straight open hearth process for which plant scrap provides 55-60 per cent. of this charge. The scrap charge is somewhat beyond the range in which optimum speed is to be expected from the open hearth. Another factor which tends to decrease the production is the fact that a large tonnage of quality steels, such as forging grades, high tensile, high silicon and low alloy steels are produced which tend to require longer heat time than do the tonnage steels.

The total installed capacity of the open hearth furnaces is 780 tons which, in accordance with the data in paragraph 39(1), should produce 499,000 tons of ingots in a modern shop under optimum conditions.

The physical condition of the shop facilities is poor and may be judged by the following extracts from Koppers' Report to Government:-

"The new Melt Shop is required not only to increase the steel production above the 1939 to 1946 level but is necessary in part at least in order that such level be maintained. No. 1 Melt Shop, whose facilities consist of a number of old open hearths, is in such a condition of obsolescence that the cost of rebuilding would be prohibitive. Even if the furnaces were rebuilt to the maximum size permitted by the space available, the shop would not lend itself to an economical operation due to the poor arrangement and type of auxiliary equipment. Although this shop maintained an average annual production of 347,792 tons between 1939 and 1946, it cannot be expected to produce much in excess of 300,000 tons in its present condition."

In view of the condition of the facilities, the types of steel produced and practice followed, not more than 60 per cent. of the production normally obtained per ton of installed furnace capacity in a modern shop can be expected from this department. This would indicate a production of 300,000 ingot tons a year. Accordingly, the production potential of this shop in its present condition may be taken as of the order of 300/325,000 tons per year. Even this rate may be difficult to achieve in view of the likelihood of further deterioration in the condition of the shop equipment.

The total present ingot production potential of the four steel-producing departments, accordingly, may be taken as 1,035,000/1,060,000 tons or approximately 1,050,000 tons per year.

(d) *Auxiliary facilities as a determinant of capacity:-* As at SCOB where it was found that capacity operation of the steel melting shop could not be achieved because of insufficient supply of pig iron, it is necessary to determine whether the auxiliary departments of the plant are adequate to supply the required quantities of raw materials to, and to process the products of, the steel melting shop.

With reference to raw materials the blast furnace capacity is adequate to provide sufficient pig iron for capacity operation of the melting shops. It is likely that the furnaces may produce approximately 50/60,000 tons of surplus iron which will be available for sale and provision should be made when calculating overheads for sales of this quantity of pig iron. Iron production may be somewhat jeopardized, however, by a shortage in the supply of coke during the rebuilding of one of the coke oven batteries now underway although insurance against such a shortage has been obtained by commitments to purchase 50,000 tons of coke.

The capacities of the finishing mills, even though replacement of facilities is badly needed in certain mills, is adequate to process capacity ingot tonnage, although a breakdown in any one finishing mill may necessitate a change from the desired product mix. The intermediate billet and sheet bar mills are adequate for their purposes.

The condition of the blooming mill which perhaps in the case of the Tata Company, is the key unit of the plant, is not good. The importance of the blooming mill results from the fact that it is the only unit in the works in which the ingots from the steel melting shops can be broken down into sizes which can be further processed in the intermediate and finishing mills. Practically all of the Tata Company's steel production must pass through this mill.

The blooming mill was installed in 1926 and has had heavy service practically every year since its installation. Normally, there would be no question of the ability of this mill to process the capacity production of ingots and after major replacements and certain improvements it is expected to process all the ingots contemplated in the Tata Company's expansion programme. The general condition of the mill now, however, is such that it is in need of major renovation both of the electrical and mechanical facilities as well as replacement of a number of soaking pits. The number of breakdowns in this mill which have delayed operations in the past several years give evidence that its continued operation in future may be somewhat endangered by the condition of the equipment. It is believed, however, that the present condition is such as will make processing of the capacity tonnage of ingots possible but major replacements to this mill cannot be delayed much longer.

(e) *Final estimate of capacity:-* In view of the deteriorated condition of many of the facilities, the Company's representatives were originally of the opinion

that no more than 750,000 tons of saleable steel should be expected from the plant in each of the next few years. The opinion of the Technical Adviser was that an average production rate of 780,000 tons based on a production of 1,051,000 tons of ingots should be obtained although it was recognised that this rate of production might be jeopardized by further delay in the replacement programme. The Company's representatives agreed to accept the Technical Adviser's opinion and, for purposes of costing, a production rate of 780,000 tons of saleable steel was adopted.

61. Works costs based on this estimate of production were developed jointly by the Company's representatives, the Cost Accounts Officer and the Technical Adviser. The works costs for each category of saleable steel are tabulated in Statement III below.

There were no major departures in the method of developing the Company's works costs from the practice of the 1948 inquiry. As regards the technical factors bearing on the works costs the Technical Adviser in consultation with the Company's representatives, set the standards. In general, these standards reflect current practice at the Tata plant and conform reasonably well with normal standards in other parts of the world making due allowance for local conditions and factors.

The prices of raw materials and stores and the rates of wages adopted in the estimates of works costs for the future were established by the Cost Accounts Officer, in consultation with the Technical Adviser and with the approval of the Board. The basis of establishing prices in the major categories of purchases was as follows:-

(1) *Raw materials:*

(a) *Coal:-* The control rates of coal were adopted in determining the coke cost in the case of both the Tata Company and IISCO.

(b) *Manganese ore, raw dolomite and limestone:-* In estimating the cost of the above materials for 1951-52, the estimated raising cost of manganese ore, raw dolomite and the latest purchase rates of limestone were taken.

(c) *Ferro-alloys and aluminium:-* The latest orders booked by the Company for these items were taken in fixing the future costs of these raw materials.

(2) *Labour:*

In the labour cost for 1951-52, provisions for the annual grade increments, performance bonus, incentive bonus, etc., to be incurred on the increased production, were made.

(3) *Stores:*

An increase of 15 per cent. for increase in stores prices, is allowed in the estimates for 1951-52 in consultation with the Company.

(4) *Spelter:*

As in the case of SCOB, spelter rate is taken at Rs. 3,500 per ton.

Statement No. III

THE TATA IRON & STEEL CO. LTD.

Statement showing estimate of production and works cost of
Billets and other categories of steel (untested).

Particulars	Total Production	Works Cost per ton	Total Cost
	Tons	Rs.	Rs.
1. (a) Blooms	5,640	117.28	6,61,459
(b) Slabs	360	135.21	48,676
2. Billets	90,720	130.58	118,46,978
3. Tin Bars	85,920	124.76	107,19,379
4. Hoe Bars	7,200	127.58	9,18,576
5. Sleeper Bars	960	127.54	1,22,438
6. Heavy Rails Tested	60,540	151.47	91,69,994
7. Light Rails	4,000	215.86	8,63,440
8. Structurals	1,33,060	162.25	215,89,314
9. Heavy Bars	9,140	168.19	15,37,257
10. Light Bars	1,25,800	153.68	193,32,453
11. Fish Plates for Light Rails (Class 'A' Tested)	1,240	297.78	3,69,247
12. Fish Plates for Heavy Rails	1,060	233.61	2,52,299
13. Plates Ordinary	69,480	175.49	121,93,045
14. Plates Acid	120	407.63	48,916
15. Black Sheets 11-14 Gauge	82,950	160.81	133,44,014
16. Galvanized Plain Sheets (Soft)	13,650	530.54	72,41,871
Galvanized Corrugated Sheets (Hard) (Tested or Untested)	17,000	520.93	88,55,810
Galvanized Corrugated Sheets (Soft) (Tested or Untested)	4,150	539.83	22,40,295
Black Corrugated Sheets Untested 24-G	34,800	201.92	70,26,816
	7,47,840	171.67	12,83,82,277
17. Sleepers Pressed	13,660	204.73	27,96,612
18. Acid Wheels & Tyres	10,960	453.46	49,69,922
19. Basic Wheels	3,180	320.83	10,20,239
20. Axles	4,360	525.42	22,90,831
	7,80,000	178.79	13,94,59,861

62. The works costs estimates for the Tata Company developed by the application of the principles with regard to production practices and prices for 1952-53 and 1953-54. stated in the preceding paragraph, are based on operation of the plant at capacity rate and in an efficient manner to standards which in general, with due regard to local factors, conform to standards of good operation elsewhere in the world. In two respects, however, it may be expected that improvement in efficiency in the future will tend to lower these costs. The yield of products from materials, both in the case of the steel melting shops and in the rolling mill operations generally, is somewhat lower than usually obtained in efficient works elsewhere. At the Tata Company, there has been no deterioration in historic percentages of yield during the past several years; on the contrary, the yields have shown a slight improvement. During the past several years, the major efforts at this plant have been directed towards the securing of increased production and the repair of deteriorated facilities. In periods of increasing production, it is a usual experience for yields to suffer. It is, however, to be hoped that as the present production becomes more or less stabilized at capacity rate, greater attention will be paid to the problem of securing an improvement in yields, resulting in an increase of production by 1 to 2 per cent. The attainment of such an improvement may, however, be a matter of several years and, therefore, any consequent decrease in works cost during the period for which these cost estimates are made will be relatively small. Having regard to the considerations set forth above it was decided to adopt current yield percentages as the basis for cost estimates for the three years from 1951-52 to 1953-54.

The major possibility for reduction in works costs, however, lies in an improvement in the efficiency of labour, the cost of which in direct employment at the steel works constitutes about 45 per cent. of the total works costs of producing steel. There may be some doubt as to what degree of efficiency in comparison with that attained in other countries should be achieved in India in view of conditions of climate, physique and nutritional and living conditions. There is no doubt, however, that the labour employed at the Tata Company is much higher than necessary even after due regard to Indian conditions. In an effort to achieve both maximum production of steel and also improved labour efficiency the Tata Company has developed and has partially implemented a sound incentive bonus plan. It is expected that the application of the scheme will result in some improvement in labour efficiency and a consequent reduction in its number. We have assumed that the expected reduction in costs on account of economy in labour will be more or less counterbalanced by the increase in expenditure due to annual grade increments, etc. Accordingly, we have not provided for such increased expenditure in the estimates for 1952-53 and 1953-54.

As indicated above, no significant changes are expected in the rate of production, manufacturing practices or in labour costs during the years 1952-53 and 1953-54 as compared to 1951-52. We have, accordingly, decided to adopt the works costs for 1951-52 as the works costs for the entire period of three years from 1951-52 to 1953-54.

Chapter V

OVERHEAD CHARGES

63. In our previous Report (1949) on the retention prices of steel, we had allowed Rs. 200 lakhs for depreciation to the Tata Company on a block of Rs. 35 crores. The rate worked out to 5.7 per cent. In the case of SCOB, we had allowed Rs. 45 lakhs for depreciation on a block of Rs. 7.5 crores. In this case, the rate worked out to 6 per cent.

The Tata Company has represented that the amount of Rs. 200 lakhs allowed by the Board for depreciation in its last Report would be far from adequate to meet essential expenditure on renewals, replacements and improvements, which have to be definitely carried out during the next six years in order to keep the plant and machinery at a high level of efficiency and maintain production at the present rate. The Company estimates that the minimum expenditure on this account during the next six years, viz., 1951-57, will be Rs. 18.90 crores, or Rs. 315 lakhs per annum. Our Technical Adviser has carefully scrutinised this programme and is definitely of the view that, having regard to the age of most units at the Company's Steel Works and also considering that the plant is being operated at 100 per cent. of the rated capacity in order to maintain a high rate of production, it is imperative that this minimum programme of replacements and improvements must be immediately taken in hand and completed in a period of six years, as otherwise the efficiency of the plant is bound to begin to decline in the near future with the possibility of a sudden breakdown in some parts. We have carefully examined this matter. We think that, having regard to the present shortage in world supplies of steel and the high cost of importing this material, it is in the national interest to encourage the existing units in the country to maintain and, if possible, expand their production of steel. From this point of view, we consider it necessary that the Tata Company should be enabled to obtain sufficient funds to carry out the essential programme of renewals and improvements within the next six years. We have, in this connection, scrutinised the balance sheets of the Company for the last few years. We find that the Company's Depreciation Fund at present amounts to Rs. 25.86 crores, Reserve Fund Rs. 8.50 crores and Sinking Fund Rs. 1.34 crores, the total amount at the credit of these three funds being Rs. 35.70 crores. Of this amount, a major part has been spent during the period from 1933 to 1950 on the improvement and expansion of certain units, such as coke oven batteries, one blast

furnace, power plant, sulphuric acid plant and the installation of a new billet mill, resulting in an increase of plant capacity from 555,000 tons in 1933 to 780,000 tons of saleable steel in 1950. Besides, over Rs. 2 crores have been spent in diversifying production in the installation of the agrico plant, alloy tool and special steel plant and wheel, tyre and axle plant. A sum of Rs. 1.94 crores has also been invested in subsidiary companies, such as the Tata Locomotive and Engineering Co., The Tinplate Company, etc. From an analysis of the Company's balance sheets over a period of years, we have formed the opinion that the Company has used the funds at its disposal in a reasonable manner, but, that, at present, it has practically no funds for expenditure on the programme of renewals and improvements mentioned above. We, therefore, consider it necessary that the allowance for depreciation should be adequate to enable the Company to carry out essential renewals and improvements within the next few years. We also consider that a suitable increase in the allowance for depreciation is economically justified in this particular case. As already mentioned, the amount allowed in our last Report was Rs. 200 lakhs. We have been informed by the Company that this is also approximately the amount to which it is entitled under the present income-tax rules. Having regard to the considerations set forth above, we propose that the net amount of depreciation should be raised from Rs. 200 lakhs to Rs. 300 lakhs per annum. This would, however, mean that a gross amount of Rs. 377 lakhs should be allowed to the Company as depreciation, which would leave a net amount of Rs. 300 lakhs, after paying a sum of Rs. 77 lakhs by way of income-tax on the amount of depreciation allowed in excess of the normal amount. If Government accepts this recommendation, the Company should set aside a net amount of Rs. 300 lakhs for depreciation, that is, after paying Rs. 77 lakhs as income-tax on the extra amount of depreciation provided by us. This also means that the extra amount of depreciation provided by us should not be taken into account for purposes of determining profit-sharing bonus.

The Steel Corporation has claimed depreciation at the rate of 6½ per cent. on its block of Rs. 7.62 crores. This would amount to Rs. 47.63 lakhs. Besides, the Corporation has asked for an extra amount of Rs. 89 lakhs for development reserve inclusive of income-tax thereon. The total amount claimed under these two heads of depreciation and development comes to Rs. 136.63 lakhs or, say, Rs. 137 lakhs. The rated capacity of the Corporation's Steel Works is estimated at 3,48,204 tons of saleable steel. Its average production during the five years from 1946 to 1950 has been 1,85,190 tons of saleable steel per annum. It will thus be seen that in the last five years, the Corporation's plant has been operated at about 53 per cent. of its rated capacity. Consequently, it cannot be considered that the wear and tear of its plant has been at anything like the normal rate. We, therefore, do not see any justification for this claim by the Corporation

for an extra amount of Rs. 89 lakhs for development. We have, however, estimated that the production of saleable steel would increase from 224,729 tons in 1949 to 311,454 tons in 1951-52 and to 348,204 tons by 1953-54. We have examined the question of a proper rate for depreciation on the basis of the estimated production in the next three years and we consider that a net rate of 7.15 per cent. on the gross block should be adequate to cover wear and tear and also provide for small improvements and balancing of plant, so as to ensure that production can be maintained at the level we have fixed. At the rate of 7.15 per cent. on a block of Rs. 7.62 crores, the net amount of depreciation would be Rs. 54.48 lakhs. It is estimated that the amount of depreciation that would be allowed under the present income-tax rules is Rs. 40 lakhs. Consequently, the amount of depreciation in excess of Rs. 40 lakhs will be liable to income-tax. In order that a net extra amount of Rs. 14.48 lakhs may be made available to the Steel Corporation for this purpose, a gross extra amount of Rs. 25.74 lakhs has been provided by us on this account. Thus, the total amount allowed under the item of depreciation is Rs. 65.74 lakhs. If Government accepts this recommendation, the Steel Corporation should set apart a net amount of Rs. 54.48 lakhs for depreciation, that is, after paying Rs. 11.26 lakhs as income-tax on the extra amount of depreciation provided by us.

64. In our previous Report, we had estimated the requirement of working capital for the Tata Company at Rs. 600 lakhs for a production of 681,000 tons and for the Steel Corporation at Rs. 200 lakhs for a production of 223,000 tons.

The Tata Company has suggested that the amount of working capital should be increased from Rs. 600 lakhs to Rs. 1,000 lakhs on the following grounds:-

- (a) Increase in production by about 15 per cent. from 681,000 tons (as fixed by the Board in 1948) to 780,000 tons.
- (b) Increase in the prices of raw materials and stores since the last inquiry.
- (c) Insistence on unlimited escalator clauses by suppliers in the U.S.A. before taking orders on their books. Suppliers from the U.K. want payments at rates ruling on the dates of shipment.
- (d) Enormous increase in the price of spelter.
- (e) The necessity of keeping at least 12 months' stock on hand in respect of imported materials, such as spelter and ferro-alloys.

We have to admit that, with the increase in production and the rise in the prices of raw materials and stores, and also, having regard to the necessity for stock-piling in respect of imports of essential materials, such as spelter and ferro-alloys, a larger amount of working capital would be required than had been estimated in 1948, and our estimate of working capital for the Tata Company for 1951-52 is as under:-

(i) Estimate of working capital in 1948	Rs. 600 lakhs
(ii) Add for increase in production by 15% over the previous estimate.....	Rs. 90 lakhs
	<u>Rs. 690 lakhs</u>
(iii) Add for increase in works costs by 10%.....	Rs. 69 lakhs
	<u>Rs. 759 lakhs</u>
(iv) Allowance for stock-piling in respect of essential imports of materials, such as spelter and ferro alloys (approximate- ly 5½% on Rs. 759 lakhs).....	Rs. 41 lakhs
	<u>Rs. 800 lakhs</u>

Interest at 4 per cent. per annum on Rs. 800 lakhs comes to Rs. 32 lakhs. The amount of interest allowed in 1948 had been Rs. 24 lakhs. Under this item, therefore, there will be an increase of Rs. 8 lakhs per annum in the case of the Tata Company.

Proceeding on the same basis, we estimate the requirement of working capital for SCOB as under:-

(i) Estimate of working capital in 1948.....	Rs. 200 lakhs
(ii) Add for increase in production by 40% (from 223,000 tons to 311,000 tons).....	Rs. 80 lakhs
	<u>Rs. 280 lakhs</u>
(iii) Add for increase in works costs by 10%.....	Rs. 28 lakhs
	<u>Rs. 308 lakhs</u>
(iv) Add 5½% for stock-piling in respect of essential imports of raw materials.....	Rs. 17 lakhs
	<u>Rs. 325 lakhs</u>

Interest at 4 per cent. on Rs. 325 lakhs comes to Rs. 13 lakhs. The amount of interest allowed in 1948 had been Rs. 8 lakhs. In the case of SCOB, therefore, the amount of interest would increase by Rs. 5 lakhs.

65. (a) The gross block of the Tata Company (as on 30-9-1950) is Rs. 42.06 crores. Deducting from this amount, the block for Agrico, miscellaneous properties and controlled stockyards amounting to Rs. 31.89 lakhs, the block that will count for depreciation (as on 30th September 1950) is Rs. 41.74 crores. Of this, again, the block for collieries is Rs. 3.34 crores. Deducting this amount, the relevant block for our present purpose will be Rs. 38.40 crores.

The gross block of the Steel Corporation is Rs. 7.62 crores.

In our previous Report, we had allowed return at the rate of 8 per cent. on the gross block. The amount of return worked out to Rs. 280 lakhs for the Tata

Company and Rs. 60 lakhs for the Steel Corporation. The Board had stated in the Report that the amount of return on block was intended to provide for taxation on profits, managing agency commission, profit-sharing bonus and dividends and reserves.

(b) The Tata Company has suggested that the rate of return on the block should be increased from 8 per cent. to 10 per cent. on the following grounds:-

(i) During the period 1946-49, the annual percentage rate of net income (after taxes) to net assets of leading iron and steel corporations in the U.S.A. had been at the rate of 11.1 per cent. There is no reason why the percentage of return in India should be much lower.

(ii) The iron and steel industry, being subject to sharp ups and downs from period to period, should be allowed to make large profits in good years in order to off-set lower profits or losses in poor years.

(iii) The steel industry in India has a large scope for expansion, but it involves risks and uncertainties in the earlier stages. Moreover, Indian capital, which is proverbially shy, has now become almost panicky. Consequently, it is necessary that a powerful and impressive support should be given to investments in this industry in order to attract large amounts of fresh capital, which is needed to expand production.

(iv) Rates of interest have been hardening since the middle of 1950.

(v) The profit-sharing scheme of the Company has had to be revised since 1948-49. According to the agreement in force at the time, labour's share of profits amounted to Rs. 40 lakhs in 1948-49, but, as labour was not prepared to accept this amount, it had to be raised to Rs. 55 lakhs. Moreover, the Company in 1948-49 had to enter into a new agreement with labour under which the share of labour in the profits of the Company had to be raised from 22½ per cent. to 27½ per cent. The Company has stated that, under the revised scheme, Rs. 78.04 lakhs had to be provided for profit-sharing bonus for the year 1949-50. The Company has, therefore, claimed that provision should be made for increased charges under this head.

(vi) The Tata Company has also suggested that, having regard to the fact that the Company's steel plant had been in operation for a much longer period than the Steel Corporation's plant, the Tata Company should be allowed a higher rate of return than the Corporation.

(c) We have considered the above suggestions of the Tata Company. By analysing the Company's balance sheets for the last few years, however, we find that the Company has been able to declare what must be considered attractive rates of dividend on its ordinary and deferred shares. The financial result of the working of the latest year for which the audited balance sheet is available, viz., 1949-50,

is also found to be satisfactory. We, therefore, do not think it necessary to allow a higher rate of return than 8 per cent. on the gross block. As already stated before, we have recognized the need for making a special provision for depreciation for this Company. Besides, in respect of one of the constituent elements of profits, viz., profit sharing bonus, where the amount of bonus had increased from Rs. 55 lakhs in 1948-49 to Rs. 78 lakhs in 1949-50, we consider that there is justification for providing an additional amount. The reason is that the return allowed in 1948-49 included an amount of only Rs. 55 lakhs for profit-sharing bonus. Since, in order to improve labour-management relations, the Company has been obliged to increase the bonus, we think it reasonable to provide an extra amount under this head. We may mention that, in considering this matter, we have been guided by two factors. In the first place, at the time of our previous inquiry we had found that the labour-management relations at the Company's steel works were far from satisfactory and that this factor had been responsible for an appreciable decrease in production. The grant of increased bonus since then has actually led to a marked improvement in labour-management relations and we believe that this has been responsible in no inconsiderable measure for an appreciable increase in production. In the second place, we have found that, but for the fact that the Company had been able to obtain an additional amount of Rs. 81 lakhs owing to the fixation of uniform retention prices of steel based on the higher cost the Steel Corporation in 1949, the financial results of the Company's operations would not have been such as to enable the Company to declare reasonable dividends on its equity shares and give an increased profit-sharing bonus to labour. For these reasons, we have allowed an extra amount of Rs. 23 lakhs to enable the Company to meet its commitments in respect of increased profit-sharing bonus to labour.

(d) The Steel Corporation has claimed that the return should be sufficient to cover the following items:-

- (i) Dividends on equity shares at the rate of 12½ per cent. free of income-tax (Rs. 73 lakhs).
- (ii) Dividends on preference shares and income-tax thereon (Rs. 11 lakhs).
- (iii) Profit-sharing bonus (Rs. 4 lakhs).
- (iv) Managing Agents' and Directors' commission (Rs. 12 lakhs).
- (v) IISCO's share of the profits of the Steel Corporation (Rs. 43 lakhs).

The total claim under these five heads comes to Rs. 143 lakhs.

We have considered the suggestions of the Steel Corporation but see no reason for allowing a higher rate of return than 8 per cent. on the firm's gross block of Rs. 7.62 crores. On this basis, the amount of return works out to Rs. 60.96 lakhs.

(f) In our previous Report (1949) on the retention prices of steel, we had allowed Rs. 60 lakhs as return for the Steel Corporation on a block of Rs. 7.5 crores. In our Report (1949) on the works cost of hot metal and fair ex-works prices of pig iron (basic and foundry grades), we had calculated Rs. 58 lakhs as return for the IISCO on its block of Rs. 7.2 crores, but, in making final adjustments regarding overheads for IISCO, we had deducted Rs. 12 lakhs as the Company's 20 per cent. share out of the profit of Rs. 60 lakhs that had been allowed for SCOB. SCOB, in its representation to the Government of India, dated 26th July, 1949, on the question of retention prices of steel, has, however, pointed out that the Board, while providing Rs. 60 lakhs at the rate of 8 per cent. on a block of Rs. 7.5 crores for SCOB, out of which Rs. 12 lakhs had to be given to IISCO as its 20 per cent. share of profits, had, in effect, allowed only Rs. 48 lakhs to SCOB. SCOB has, therefore, claimed that, over and above a return of 8 per cent. on its block, an additional amount should be provided so as to enable it to pay 20 per cent. share of profits to IISCO. We consider that this contention is justified because SCOB is entitled to a return of 8 per cent. on its gross block, after providing for all necessary payments due to IISCO for the purchase of hot metal under the IISCO-SCOB Agreement. The IISCO share of 20 per cent. out of the profits of SCOB should in fairness be regarded as forming a necessary element in the cost of purchasing hot metal. In this connection, we may point out that the terms of the IISCO-SCOB Agreement, specially in respect of depreciation charges, are particularly favourable to SCOB so long as adequate supplies of hot metal are made available so as to enable SCOB to operate its plant at its rated capacity. In order that SCOB may retain Rs. 60.96 lakhs by way of return on its block (i.e., at 8 per cent. on its block of Rs. 7.62 crores) after paying 20 per cent. of its total profits to IISCO, an additional amount of Rs. 15.24 lakhs should be provided: (Total profits Rs. 76.20 lakhs; SCOB's share Rs. 60.96 lakhs and IISCO's share Rs. 15.24 lakhs). We have, therefore, provided an extra amount of Rs. 15.24 lakhs as IISCO's share of the profits of SCOB under the IISCO-SCOB Agreement.

66. In our previous Report, we had allowed Rs. 19 lakhs for head office expenses for the Tata Company and Rs. 10 lakhs for the Steel Corporation. The same amounts are provided in respect of 1951-52 as well.

67. In our previous Report, we had allowed Rs. 14 lakhs for selling expenses for the Tata Company and Rs. 4 lakhs for the Steel Corporation, approximately at the rate of Rs. 2 per ton of steel.

The Tata Company has stated that its selling expenses in respect of mild steel in 1951-52 will be Rs. 20.5 lakhs and that a provision for this amount has been actually made in its budget for the year. The Company has, therefore, claimed

that this amount should be allowed. We had carefully considered this matter in our previous inquiry and decided that the rate of Rs. 2 per ton should be adequate for selling expenses. We are satisfied that the same rate should be sufficient for this purpose in future also. Accordingly, we have allowed Rs. 15.60 lakhs for selling expenses for the Tata Company for a production of 780,000 tons and Rs. 6.24 lakhs for the Steel Corporation for a production of 311,454 tons.

68. In our previous Report, we had allowed Rs. 30 lakhs for the Tata Company for a production of 681,000 tons and Rs. 10 lakhs for the Steel Corporation for a production of 223,000 tons. Having due regard to the actual increase in production by 15 per cent. in the case of the Tata Company and expected increase in production by 40 per cent. in the case of the Steel Corporation, and after allowing for an average increase of about 10 per cent. in works costs, we have provided Rs. 40 lakhs as margin for contingencies for the Tata Company and Rs. 16 lakhs for the Steel Corporation.

69. Under the IISCO/SCOB Agreement, the following payments are due to be paid by the Steel Corporation to IISCO:-

- | | |
|--|---|
| Special charges payable by the Steel Corporation to IISCO. | (1) Price of hot metal consisting of, |
| | (i) the works costs; |
| | (ii) head office expenses; |
| | (iii) depreciation at 5 per cent. on the depreciated book value of the plant engaged; |
| | (iv) a proportion of the debenture interest for the time being payable; and |
| | (v) 5 per cent. surcharge on the total cost of items (i), (ii), (iii) and (iv). |
| | (2) IISCO is entitled to a surcharge of 10 per cent. on the works cost of the auxiliary services and on an agreed proportion of the cost of municipal services. |
| | (3) IISCO is to receive 20 per cent. of the net profits made by the Steel Corporation on despatches and sale of steel. |

We have already provided for item (3), viz., IISCO's share amounting to 20 per cent. of the net profits made by the Steel Corporation. Provision for item (1) (i), viz., works costs of hot metal, has been included in the works costs of steel. The amounts due under items (1) (ii), (1) (iii), (1) (iv) and (1) (v) and item (2) are estimated at Rs. 51.50 lakhs. Under the IISCO/SCOB Agreement, this amount should have been included in the works costs, but, for obtaining figures of works costs on the basis of a complete integration of the Hirapur plant of IISCO and the SCOB plant, we decided to exclude this amount of Rs. 51.50 lakhs from the works costs of SCOB and allow it under overheads. The advantage of

this procedure is that while providing for all the special charges for hot metal and services which are due to be paid by the Steel Corporation to IISCO under their Agreement, we are able to obtain data for works costs for hot metal as well as for steel ingots on the same basis as for the Tata Company, so that there may be a fair comparison between the costs of the two Companies.

70. There are three special items of costs for the Tata Company, which should have been included in the works costs, but had been disallowed by the Cost Accounts Officer in preparing the costs sheets. These items are:-

- (i) *Bonus and penalty payments on coal purchased from outside:* The Company buys about 60 per cent. of its requirements of coal from outside collieries. From 1945 onwards, under an agreement with the suppliers of coal and the Coal Controller, the Company has instituted a system of bonus and penalty payments, based on the ash content of the coal supplied to it. Such bonus and penalty payments are made over and above the statutory prices fixed for the various grades of coal. By this system, the Company has been able to obtain coal of better quality, resulting in a definite reduction in its coke consumption. The Company has claimed that a suitable provision should be made on this account. On the basis of average expenditure during the three years from 1947-48 to 1949-50, the Company has claimed that a sum of Rs. 6.27 lakhs a year should be provided on this account. Since the enforcement of this system of bonus and penalty payments on coal supplies has actually resulted in an improvement in the quality of coal and a consequent reduction in coke consumption, we consider that this claim is justified in principle. We, however, find that the average expenditure on this account during the five years from 1945-46 to 1949-50 amounted to Rs. 4.88 lakhs per annum. We have allowed this amount.
- (ii) *Coal crushing charges:* The Company has no crushers of its own, but pays an extra 8 annas per ton for the supply of crushed coal required by it. The amount spent on this account in 1950 was Rs. 1.6 lakhs. We have provided for this amount.
- (iii) *Coal stowing cess:* Since the completion of our estimates of works costs for different products, the coal stowing cess under the Coal Mines Safety (Stowing) Act has been raised from 3 annas to 6 annas per ton. Additional expenditure involved on this account is estimated at Rs. 3.75 lakhs. We have allowed this amount. A similar provision has been made by us for the Steel Corporation under the head of 'Special charges payable to IISCO'.

71. The amount of overheads for the Tata Company as provided in the previous Credit for Tata Company's paragraphs comes to Rs. 824.03 lakhs. From this amount, profits on sale of surplus pig iron, ferro-manganese etc. however, we have to deduct the estimated profits made by the Company on the sale of surplus pig iron and ferro-manganese and realisation on supply of water and electricity. The estimates are as follows:-

	Rs.
(i) Profits on sale of surplus pig iron.	20 lakhs
(ii) Profits on sale of ferro-manganese.	5 lakhs
(iii) Realisation on supply of water and electricity.	9 lakhs
Total.	34 lakhs

It may be mentioned that in our previous Report we had also given credit for Rs. 5 lakhs on account of profits on the sale of special steels. The Company has informed us that, due to an increase in the costs of raw materials for special steels, which are sold at control prices, the Company makes no profits on the sale of this article. We think that this contention is reasonable and have accordingly given no credit for special steels.

72. The following tables show the amounts of overhead charges allowed to the two Companies in respect of 1951-52. The amounts of corresponding allowances as given in our previous Report are also reproduced for purposes of comparison.

Items	Tata Company	
	As given in the Board's previous Report.	1951-52
	Lakhs of Rupees	Lakhs of Rupees
1. Depreciation:		
(a) Normal	200.00	200.00
(b) Special provision for depreciation including taxation on the amount in excess of the normal allowance ... ..	..	177.00
Gross	Rs. 177 lakhs	
Tax	Rs. 77 lakhs	
Net	Rs. 100 lakhs	
2. Interest on working capital... ..	24.00	32.00
3. Return on block	280.00	307.20
4. Special provision for increased profit-sharing bonus ..	..	23.00
5. Head office expenses	19.00	19.00
6. Selling expenses	14.00	15.60
7. Margin for contingencies	30.00	40.00
8. Extra for coal	10.00	10.23
Total.	577.00	824.03
Deduct for profits on surplus pig iron, etc.	24.00	34.00
Net ...	553.00	790.03

It may be noted that the total amount of overheads has increased from Rs. 577 lakhs to Rs. 824.03 lakhs, that is, by about Rs. 247 lakhs. Out of this amount, Rs. 100 lakhs is for special depreciation and Rs. 77 lakhs for income-tax thereon, Rs. 8 lakhs on account of interest on working capital; Rs. 27.20 lakhs for increase in return on block on account of additions to the block; Rs. 23 lakhs for increase in profit-sharing bonus; Rs. 1.60 lakhs for increase in selling expenses; Rs. 10 lakhs for increase in margin for contingencies; and Rs. 0.23 lakh for extra cost of coal.

Items	Steel Corporation	
	As given in the Board's previous Report	1951-52
	Lakhs of Rupees	Lakhs of Rupees
1. Depreciation:		
(a) Normal	45.00	40.00
(b) Special provision for depreciation including taxation on the amount in excess of the normal allowance		25.74
Gross	Rs. 25.74 lakhs	
Tax	Rs. 11.26 lakhs	
Net	Rs. 14.48 lakhs	
2. Interest on working capital... ..	8.00	13.00
3. Return on block	60.00	60.96
4. IISCO's share of profit ... ..	.	15.24
5. Special charges payable to IISCO under IISCO/SCOB Agreement ... ..	.	51.50
6. Head office expenses	10.00	10.00
7. Selling expenses	4.00	6.24
8. Margin for contingencies	10.00	16.00
Total.	137.00	238.68

It may be noted that the total amount of overheads for the Steel Corporation has increased from Rs. 137 lakhs to about Rs. 239 lakhs, that is, by about Rs. 102 lakhs. Of this amount, Rs. 25.74 lakhs is for special depreciation, out of which, however, Rs. 11.26 lakhs will be paid as income-tax; Rs. 5 lakhs is on account of interest on working capital; Rs. 0.96 lakhs is due to increase in return on block; Rs. 15.24 lakhs is IISCO's share of 20 per cent. out of the profits of SCOB, which had been left out in our previous Report; Rs. 51.50 lakhs on account of charges payable for hot metal under the IISCO/SCOB Agreement, which ought to have been included under works cost; Rs. 2.24 lakhs for increase in selling expenses and Rs. 6.00 lakhs for increase in margin for contingencies. There has, however, been a decrease of Rs. 5 lakhs under normal depreciation.

Chapter VI

FUTURE RETENTION PRICES

73. In allocating overheads among the various products, we have taken into account the following factors:-
 Allocation of overheads. (i) The proportionate value of the plant and equipment employed in the manufacture of the specific products concerned. For this purpose, we have divided all the products into three groups, viz.,

- (a) semis, such as blooms and billets;
- (b) products requiring only one finishing process, such as bars and rods, structurals, rails and plates. The articles under this sub-group may be broadly defined as structural steel; and
- (c) special products, such as sheets, axles and wheels, where the degree of processing is comparatively high.

(ii) Products of the same mill, such as, for instance, billet and sheet bar mill, are treated more or less on the same footing, subject to adjustments for differences in the degree of processing. This procedure will have the advantage that any large variations in the product mix of any particular mill will not materially affect the aggregate amount of overheads allocated to the total production of that particular mill.

(iii) The amount of overheads for those nine categories of steel products which are common to both the companies are so adjusted that, despite differences in works costs of comparable items, the prices of such items for the two companies may be more or less equal.

It may be noted that in allocating overheads, we have taken into account only the net quantity of saleable steel; that is to say, steel consumed in the works for maintenance purposes has been excluded for this purpose. The net quantity of saleable steel has thus been estimated at 7,66,000 tons in the case of the Tata Company and 3,09,554 tons in the case of SCOB. It may be also mentioned that, as in our previous Report, we have allocated Rs. 10 more in overheads per ton for the standard products than for the non-standard products and defectives. And in making the necessary adjustments for this differential in respect of overheads for the two classes of products, we have taken the quantity of products grouped as non-standard and defective at 25,000 tons for the Tata Company and 15,000 tons for SCOB.

74. In Chapter IV, we have given our estimates of future works costs of various steel products for the Tata Company and SCOB (vide paragraphs 52, Fair ex-works retention prices. 59 and 61). In allocating the overheads among the various products, we have been guided by the considerations set forth in the previous paragraph. The following statement gives our estimates of works costs, overheads and fair ex-works retention prices of various products manufactured by the two companies:-

Statement No. IV

(A) THE TATA IRON & STEEL COMPANY LIMITED

Sl. No.	Name of the product (untested quality).	Estimate of Works Costs per ton.	Overheads per ton.	Estimated Ex-works Fair Retention Price per ton.
(1)	(2)	(3)	(4)	(5)
		Rs.	Rs.	Rs.
1	(a) Blooms	117	61	178
	(b) Slabs	135	61	196
2	Billets	131	72	203
3	Tin Bars	125	72	197
4	Sleeper Bars	128	85	213
5	Structurals, bearing plates and Crossing Sleeper Bars.	162	101	263
6	*Rails (heavy) 50/100 lbs	151	101	252
7	Bars and Rods (rounds & squares below 3" and flats upto and in- cluding 5" wide),	154	101	255
8	Bars -do.- (rounds & squares 3" and above and flats over 5" wide).	168	101	269
9	Rails (Light) 30 lbs. and below	216	101	317
10	Fish Plates for Light Rails	298	113	411
11	*Fish Plates for Heavy Rails Class 'A'	234	113	347
12	Black Sheets (11- 14 Gauge)	161	139	300
13	Galvanized Corrugated Sheets (Hard Iron) G/24 (6'/10').	521	142	663
14	Plates (3/8" and up)	175	101	276
15	*Plates acid steel (3/8" and up)	408	101	509
16	*Pressed Sleepers	205	101	306
17	*Acid Wheels and Tyres	453	153	606
18	*Basic Wheels	321	153	474
19	*Axles	525	153	678
20	Black Corrugated Sheets (Hard Iron) G/24.	202	142	344

*Tested quality.

(B) THE STEEL CORPORATION OF BENGAL, LTD.

Sl. No.	Name of the product (untested quality).	Estimates of works costs per ton.	Overheads per ton.	Estimated ex-works Fair Retention Price per ton.
(1)	(2)	(3)	(4)	(5)
		Rs.	Rs.	Rs.
1	Blooms.	138	40	178
2	Billets.	160	43	203
3	Structurals.	170	85	255
4	Bars & Rods (rounds & squares below 3" and flats upto and including 5" wide).	175	80	255
5	*Rails (Heavy) 50/100 lbs.	163	89	252
6	Rails (Light) 30 lbs. and below.	190	87	277
7	Black Sheets (11- 14 Gauge).	211	89	300
8	Galvanized Corrugated Sheets (Hard Iron) 6/24 (6'/10').	548	101	649
9	Black Corrugated Sheets (Hard Iron) 24G	243	101	344

*Tested Quality.

The following table gives the fair ex-works retention prices for comparable items produced by both companies.

FAIR EX-WORKS PRICES FOR COMPARABLE ITEMS

S.No.	Items	TATA COMPANY	SCOB
		Rs.	Rs.
1.	Blooms.	178	178
2.	Billets.	203	203
3.	Rails (Heavy) 50/100 lbs.	252	252
4.	Bars and rods (rounds and squares below 3" and flats upto and including 5" wide).	255	255
5.	Black Sheets (11- 14 Gauge).	300	300
6.	Black Corrugated Sheets (Hard Iron) 24 G.	344	344
7.	Structurals, bearing plates and crossing sleeper bars.	263	255
8.	Rails (Light) 30 lbs. and below.	317	277
9.	Galvanized Corrugated Sheets (Hard Iron) 24 G (6"/10")	663	649

75. It will be seen from the figures given above that out of the nine items of common products, the estimated fair ex-works retention prices for six items, viz., blooms, billets, rails (heavy), bars and rods (rounds and squares below 3" and flats upto and including 5" wide), black sheets (11-14 Gauge), black corrugated sheets (hard iron) G/24, are equal. As regards the remaining three items, the difference in the case of structurals, bearing plates and crossing sleeper bars is Rs. 8, rails (light) Rs. 40 and galvanized corrugated sheets Rs. 14. Having regard to the fact that uniform retention prices of steel have been fixed since the commencement of control over steel prices and also in view of the fact that the estimated fair ex-works retention prices are equal in respect of most items of steel which are common to both the companies, we think it proper that the system of uniform retention prices should be continued for the next three years also. It will be seen that there is no difficulty in fixing uniform prices for those six categories of steel products in respect of which the estimated fair ex-works prices are equal. As regards structurals (viz., item 7), the retention price should be fixed at Rs. 263 per ton, which is the estimated fair ex-works price for this article in the case of the Tata Company. As for rails (light) 30 lbs. and below, the difference between the fair ex-works prices for the two companies is, as stated above, as high as Rs. 40. To fix the retention prices on the basis of the Tata Company's figure would lead to an undue increase in the price of this article and also provide excessive profit margin to SCOB. We, therefore, suggest that the retention price for this article should be fixed approximately at the average of the ex-works prices of the two companies, viz., Rs. 290. In the case of galvanized corrugated sheets (hard iron) G/24 (6'/10'), for similar reasons, we recommend that the fair retention price should be fixed at Rs. 656 per ton, which is the average of the ex-works prices for the two companies. Having regard to the considerations set forth here, we recommend that retention prices of steel should be fixed as shown in the following statement No. V. For facility of comparison, the current retention prices of various categories of steel are also reproduced in the statement. The increase in retention prices over the current retention prices for each item, both in terms of rupees and percentages, is also shown against each item.

(Statement No. V on next page).

Statement No. V

Future Retention Prices per ton of Steel (1951-52, 1952-53, 1953-54)

Name of the product	TATA	SCOB	Present retention prices	Proposed retention prices	Increases	
					In Rupees	In percentage
	Rs.	Rs.	Rs.	Rs.		
1. (a) Blooms.	178	178	163	178	15	9.20
(b) Slabs.	196	-	-	196	-	-
2. Billets.	203	203	190	203	13	6.84
3. Tin Bars.	197	-	170	200	30	17.65
4. Sleeper Bars.	213	-	197	213	16	8.12
5. Structural, Bearing plates & Crossing Sleeper Bars.	263	255	230	263	33	14.35
*6. Rails (Heavy) 50/100 lbs.	252	252	230	252	22	9.57
7. Bars & Rods (rounds & squares below 3" and flats upto and including 5" wide).	255	255	239	255	16	6.69
8. Bars & Rods (rounds & squares 3" and above and flats over 5" wide).	269	-	221	269	48	21.72
9. Rails (Light) 30 lbs. and below.	317	277	255	290	35	13.73
10. Fish Plates for Light Rails.	411	-	361	400	39	10.80
*11. Fish Plates for Heavy Rails. Class 'A'.	347	-	301	337	36	11.96
12. Black Sheets (11-14 Gauge).	300	300	292	300	8	2.74
13. Galvanized Corrugated Sheets (Hard Iron) G/24 (6'/10').	663	649	421	656	235	55.82
14. Plates (3/8" and up).	276	-	260	276	16	6.15
*15. Plates Acid Steel (3/8" and up).	509	-	447	509	62	13.87
*16. Pressed Sleepers.	306	-	245	306	61	24.90
*17. Acid Wheels and Tyres.	606	-	560	606	46	8.21
*18. Basic Wheels.	474	-	-	474	-	-
*19. Axles.	678	-	609	678	69	11.33
20. Black Corrugated Sheets (Hard Iron) G/24.	344	344	-	344	-	-

*Tested Quality.

76. Both the companies have represented to us that in order to enable the companies to carry out their production plans without frequent interruptions, it is necessary to fix retention prices for a period of three years, subject to the proviso that if the works costs increased to any significant extent owing to variations in factors over which they had no control, such as, prices of raw materials, rates of wages and allowances based upon Tribunal awards, the necessary adjustments should be made in the retention prices. We have carefully considered this matter and agree that for maintaining stability of prices in the interests of manufacturers as well as consumers, it is desirable that the new retention prices should be fixed for a reasonable period. So far as the Tata Company is concerned, we do not anticipate that in normal circumstances, there would be any significant changes in the level of the Company's production of works costs during the next three years. As for SCOB, we anticipate that, should the Company carry out our recommendations regarding minor additions to auxiliary equipments and improvements in metallurgical practices, its production should go up from 311,000 tons in 1951-52 to 348,000 tons by 1953-54, thereby resulting in a reduction of costs of various categories of steel by about Rs. 6 per ton. But, as these proposed improvements are likely to be spread over a period of two to three years, their full effect on the works cost is not likely to be felt till towards the end of the year 1953-54. Having regard to these considerations, we recommend that the proposed retention prices should be fixed for a period of three years.

77. As mentioned in the previous paragraph, both the companies have suggested that while fixing retention prices for the next three years, provision should be made for automatic revision of retention prices on account of increases in costs of items over which they have no control. We discuss this question below under three broad headings:-

(a) Spelter: In the cost estimates as originally prepared by the Cost Accounts Officer, the price of spelter had been taken at Rs. 2,427 per ton on the basis of actual orders placed by the Tata Company in October, 1950. During the inquiry the Iron & Steel Controller brought it to our notice that the price of spelter had already increased to Rs. 4,000/4,100 per ton and that, even at that price, it was extremely difficult to procure. It was also pointed out that if the price of spelter were taken at Rs. 2,427 per ton as against its ruling price of Rs. 4,100 per ton, the necessary compensation payable to the two companies, in accordance with the Board's recommendation in the previous Report, would amount to about Rs. 1 crore a year. It was also contended that if the price of spelter were taken at a much lower figure than the actual market price, for purposes of costing the difference being compensated, as at present, from the Equalisation Fund, it would practically mean that the consumers of galvanized sheets would be subsidized at the cost of users of other kinds of steel, thereby tending to give an

undue advantage to the consumers of galvanized sheets as against those of black sheets and other categories of steel. We consider that there is force in this contention. We, however, feel that if the galvanized sheets were to be loaded with the full rise in the price of spelter, the price of such sheets would go up enormously, which would place a heavy burden on the consumers of such sheets, amongst whom are included large numbers of agriculturalists. Having regard to these considerations and in consultation with the Technical Adviser and the Iron and Steel Controller, we have decided to take the price of spelter at Rs. 3,500 per ton for purposes of estimating works costs. This will, however, mean that the companies will have to be compensated out of the Equalization Fund for the excess expenditure on account of increase in the price over Rs. 3,500 per ton of spelter, which they may have to incur in obtaining supplies of the article. Conversely, it would also follow that if the price of spelter declined below Rs. 3,500 per ton, the difference on this account should be refunded by the Companies to the Equalization Fund. For the purpose of such adjustments in payments from or to the Equalization Fund, the rate of consumption of spelter per ton of galvanized sheet has to be fixed. In our previous Report, we had fixed the rate of consumption at 175 lbs. per ton of sheets. We are, however, informed that the consumption of spelter for different qualities of galvanized sheets would vary.¹ In this connection, we are advised that, for purposes of fixing the rate of consumption of spelter, galvanized sheets may be broadly divided into two classes, viz. ordinary grades and special grades. Our Technical Adviser estimates that the average consumption of spelter for ordinary grades may be taken at 175 lbs. and that for special grades at 200 lbs. per ton of galvanized sheets. We recommend that if and when there are large variations in the price of spelter as compared to the price we have taken in our cost estimates, payments to the companies from the Equalization Fund on account of increased prices of spelter and, conversely, refunds to the Equalization Fund by the companies in case of decreased prices, should be made on the basis of a consumption rate of 175 lbs. for ordinary grades and 200 lbs. for special grades of galvanized sheets. For this purpose, the Iron and Steel Controller should be authorised to estimate the respective quantities of ordinary grades and special grades of galvanized sheets produced by the two companies from time to time. In case of a sustained decrease in the price of spelter, however, Government may also consider a reduction in the retention price of galvanized sheets for the benefit of the consumers.

In this connection, it may be mentioned that in our previous Report, we had taken the cost of spelter at Rs. 832.45 per ton for the Tata Company and Rs. 898.09 for SCOB. On the present occasion, we have taken, as already mentioned, Rs. 3,500 per ton as the cost of spelter. The effect of this is an increase in works cost of galvanized sheets by about Rs. 224 per ton. It may also be mentioned that if

e had taken the spelter cost at Rs. 4,100 per ton, being the current market price, the works cost of galvanized sheets would have increased by a further Rs. 50 per ton.

(b) *Raw materials and stores (except Spelter)*: Both the companies have claimed that there should be provision for automatic adjustments in retention prices on account of future increases in the prices of coal, limestone, sulphur, refractories, etc. We have considered this matter and do not see any reason to anticipate that there will be significant increases in the prices of these articles over their current levels in the next three years. If, however, owing to the influence of unforeseen factors, the price of any of the important raw materials, which have to be purchased by the companies, increase to an appreciable extent so as to affect the works costs seriously, Government should examine the question of increasing the retention prices in a suitable manner. Contrarywise, if there is a decrease in the price of any such raw materials and stores so as to cause an appreciable reduction in the works costs, Government should examine the question of reducing the retention prices.

(c) *Freights, labour welfare legislation, etc*: The Tata Company has also suggested that provision should be made for revising retention prices if the works costs go up owing to reasons beyond the manufacturers' control, such as, increases in freight rates or imposition of charges under any labour welfare schemes. We recommend that in case of any significant increase in works cost due to the influence of factors arising out of Government action, such as, increases in freight rates or labour welfare legislation, Government should, as in sub-paragraph (b) above, examine the position, and if necessary, revise the retention prices.

78. From Statement No. V (vide paragraph 75), it will be seen that the increase in the retention prices of various steel products we have recommended, vary from 2.74 per cent. in the case of black sheets (Item 12) to 55.82 per cent. in the case of galvanized sheets (Item 13). If we leave out (i) galvanized sheets, for which most of the increase in price is due to the higher cost of spelter, and (ii) pressed sleepers, which is a speciality item, the range of price increases would be from 2.74 per cent. to 21.72 per cent. over the current level of prices. To the extent that the proposed increase in price is based on increases in works costs, compensatory increase in the retention price is unavoidable. A part of the proposed increase in price is due, however, to a somewhat larger provision for depreciation, and it may be questioned whether this part of the increase in retention price is justifiable, particularly in view of the present inflationary trends in the country. As already explained in paragraph 63, although we have provided for depreciation in excess of the amount allowed for income-tax purposes, it is no more than what our Technical Adviser considers to be absolutely necessary in order to ensure that the plant facilities at the two steel works may be maintained at the optimum level.

As regards the effect of the proposed increase in retention prices on the general level of prices, we may point out that although steel is an article of basic importance in the economy of the country, its price enters only in a small and remote way into the general cost of living. We are also inclined to think that in the case of an article of basic necessity like steel, for which there is considerable scope for expansion in the country, the advantage of increased production within the limits of the currently available facilities will outweigh the disadvantage of a small increase in price, which is of the order of 10 per cent. over the current level of steel prices.

It may also be pointed out, in this connection, that, of all the important commodities, the price of steel has shown the least increase in the last 12 years. This will be seen from the following index numbers:-

Index numbers of wholesale-prices for the week ended 21st April, 1951
(Base: August, 1939 100)

(Issued by the Office of the Economic Adviser to the Government of India)

1. Iron and Steel manufactures	210
2. Machinery	335
3. Jute manufactures	1,000
4. Cotton manufactures	410
5. Woollen manufactures	329
6. Cement	258
7. Chemicals	320
8. Dyestuffs	305
9. All commodities सत्यमेव जयते . .	455.5

79. (a) Prices of non-standard and defective products (including cuttings): As mentioned in paragraph 73, we had reduced the average overheads for defectives and cuttings by Rs. 10 per ton on the ground that the realisation on the sales of such defective materials would be lower than that on standard products. These defectives and cuttings were taken into account as good materials for purposes of working out the average works cost of all steel products. By reducing the overheads for these by Rs. 10 per ton, it had been intended by us that their retention prices should be just Rs. 10 less than those on corresponding standard products of similar categories. In the course of the present inquiry, however, we have been informed by the Tata Company that no payment has been made so far in respect of defectives and cuttings owing to certain differences of opinion between the manufacturers and the Iron and Steel Controller regarding the actual items and quantities to be taken as defectives and cuttings. We raised this question with the Iron and Steel Controller. He pointed out that

there were two difficulties in carrying out the recommendations of the Board in this respect. In the first place, it had not been made clear in the Board's Report whether it was the Board's intention that payments should be made for defectives and cuttings on the basis of the quantities estimated by the Board or whether such payments should be made on the basis of actual production of defective materials from time to time. In the second place, it was explained that some of the items which the Board had taken in its previous Report as defectives and cuttings are listed under Scrap Price Schedule No. 1 of 1949 dated 5th February, 1949, issued by the Iron and Steel Controller. In other words, certain items which had been taken by the Board as defectives and cuttings are classified as scrap in the Iron and Steel Controller's Scrap Price Schedule. These disputed items which had been taken by the Board as defectives and cuttings for the purpose of price determination, are thus treated in the Iron and Steel Controller's Schedule as scrap, which, consequently, fetches a lower price than had been intended by the Board. As a result of our discussion with the Iron and Steel Controller and Shri C.R. Natesan, Deputy Secretary to the Government of India, Ministry of Commerce and Industry, it was agreed that Government would issue orders authorising payment for defectives and cuttings on the basis of the actual production of such defectives and cuttings, as categorised by the Board.

(b) *Transport facilities:* The steel companies have represented that although the general transport position in the country had improved considerably, the situation in regard to the availability of special types of railway wagons required for the transport of bulk materials was unsatisfactory, which resulted in curtailment of blast furnace operations now and then. We recommend that the Railway Board should explore the possibility of supplying the special types of wagons as required by the steel companies.

(c) *Charges for extras:* The works cost of producing various classes of steel products, like the cost of any other manufactured article, varies with the amount of processing required and the consumption and cost of materials. An example of such extra manufacturing cost in the steel industry is found in the case of "tested" steels. The manufacture of this tested grade of steel in comparison with the untested may require additional quantities of ferro-alloys, greater wastage of materials due to higher scrap losses and greater expense for the necessary chemical and physical tests. Another example of a different type is the manufacture of black sheets. The production capacity of a sheet mill varies in inverse proportion to the thinness or the gauge of the sheet. The rate of production of 11-14 gauge sheets, for instance, is much greater than that of the much thinner 30 gauge. The labour force in each case, however, required for the operation of the plant is the same. Consequently, the works cost of thin sheets is much higher than that of the thicker grades.

The pricing system in the industry provides compensation for such costs differentials in the manufacturing process by the establishment of a base price for ordinary grades and types to which "extras" are added to compensate for the additional manufacturing costs of products made to specifications not contemplated in the ordinary grades. These "extras" are expected to represent the additional costs of manufacturing such special grades. In the example cited above, in the case of "tested steel", with the exception of heavy rails, a base price is established for the untested grade to which an extra of Rs. 10 is added if "tested" quality is specified. In the instance of black sheets, a base price is established for 11-14 gauges and extras are added for thinner gauges, the extra for the 30 gauge sheet, for instance being Rs. 77 per ton.

In an inquiry like the present, it is obviously impossible to determine the works costs of producing each individual item of the many hundreds of products of different specifications produced by the steel industry. The practice adopted by the Board for the determination of the works costs of the ordinary base grades of steel is to deduct from the works costs of producing all grades of steel in any one category, such as structurals, bars, sheets, etc., the total amount of extras received per ton for that particular category of product. We are advised that there is nothing wrong with the method, provided the extras charged accurately reflect the additional costs of producing steel of such special grades. Unfortunately, however, the charges for "extras" in India were established a number of years ago and were based on foreign standards prevailing at that time. Since the establishment of the extra charges, there have been occasional reviews of such charges but it is doubtful whether at the present time the extras now charged are correctly related to the actual cost increases incurred in the manufacture of the specific product for which the particular extra is charged.

During the years 1936-39, the American Iron and Steel Institute, recognising that the then current list of extras in the American steel industry had not been established on an engineering and economic basis and had little, if any, relationship to actual differences in manufacturing costs, carried out, through its Technical Committees, an intensive study of the manufacturing cost of special products for which extras are charged. Mr. Martin, our Technical Adviser for the present inquiry, was a member of the Pig Iron and Ferro Alloy Committee which investigated the charges for extras in that specific field. As a result of these studies, proper charges were determined and established. We are informed that such charges are periodically reviewed and revised in the light of American manufacturing costs.

The existence of a level of extra charges lower than the actual manufacturing cost tends to decrease the quantities of steel produced from any given plant. This condition results from the fact that, if the consumer does not have to pay a

proper differential for steel of special grades over the price for base grades, he is very apt to "over-specify" the grades of steel which he orders. As the quantity of the ordinary grades of steel which can be produced from any given unit is greater than the quantity of special steel which can be manufactured by the same unit, "over-specification" results in decreased production. In view of the extreme shortage of steel in India, production must be maximised and should not suffer a reduction because of such "over-specification" as a result of an improper system of charging for extras.

In view of the method of determining works costs of standard grades of steel for purposes of pricing and the consequent influence of "extra" charges on prices for the ordinary grades of steel as well as the danger that steel production may suffer from the existence of inadequate charges for extras, it is desirable that a study should be made of the current cost of producing special grades of steel for which extras are charged in India. This study should be based on Indian conditions with regard to raw materials, plant facilities and practices. Such a study may be a matter of a few years and must be made by specialists. The newly established Industrial Engineering Department at the Tata Company should be well qualified for such work.

We, therefore, recommend that a small expert committee should be appointed to direct a study of the costs of manufacturing special grades of steel, the detailed work of which study, however, is to be done by the companies themselves and, that, based on the conclusions and recommendations of this study, new schedules of extra charges for special products of the Indian steel industry should be established.

80. Our main conclusions and recommendations may be summarised as under:-

Summary of conclusions and recommendations. (1) The scope of the present inquiry covers (a) an examination of the cost of production of steel by the Steel Corporation of Bengal (SCOB) and the Tata Iron and Steel Company (Tata Company) for the year 1950, with a view to determining whether, and to what extent, if any, there should be a revision of the retention prices of steel for 1950; and (b) an estimation of the future cost of production of steel at the works of the two companies with a view to recommending a suitable schedule of retention prices of steel for a period of two or three years from 1st May, 1951. [Paragraphs 2(a) and (b)]

(1i) The works costs of both the companies had increased in 1950 over the estimates made by the Board in 1948, on which the current retention prices are based, owing to three main factors, viz., (a) increases in the prices of raw materials, stores and labour, (b) variations in the usage of materials, stores, labour, etc., and (c) variations in the volume of output. Of these three factors, while factor (a) is largely beyond the control of the manufacturers, factors (b) and (c) are almost entirely within their control. [Paragraph 10]

(iii) The weighted average works cost of all categories of saleable steel manufactured by SCOB during the year 1950 had increased by about Rs. 44 above the estimate made by the Board in 1948. The corresponding weighted average works cost of all categories of saleable steel manufactured by the Tata Company during 1950 was about Rs. 6 above the estimate made by the Board in 1948. [Paragraphs 12 and 17]

(iv) The operation of SCOB's plant at general standards of technical and managerial efficiency would have resulted in a reduction in the works cost for 1950 by approximately Rs. 33. The remainder of the increase, amounting approximately to Rs. 11, was due to increases in prices and wages and represents that portion of the total increase which was beyond the control of the management. Paragraphs 18 to 36]

(v) The increase in the works costs of the Tata Company for 1950, amounting approximately to Rs. 6, was due solely to increases in prices and wages, which were beyond the management's control. [Paragraphs 17 and 27 to 33]

(vi) If it is the intention of Government to compensate the companies only for the calendar year 1950 for increases in works costs, which were beyond the management's control, compensation should be paid to the Steel Corporation of Bengal at the rate of Rs. 11 per ton of steel sold during the year. The corresponding rate of compensation for the Tata Company will be Rs. 6 per ton. [Paragraph 36]

(vii) If, however, it is Government's intention to compensate the companies also for similar increases in works costs during that portion of the year 1951 to which the retention prices based on the findings of the present inquiry do not apply, as well as for 1950, each company should be paid compensation at the rate of Rs. 11 per ton of steel sold from 1st January, 1950, to the date on which such retention prices become effective. [Paragraph 36]

(viii) In estimating works costs for the period from 1951-52 to 1953-54, we have taken the production of SCOB at 311,454 tons of saleable steel per year. [Paragraphs 39 to 59]

(ix) The production taken for the Tata Company is 780,000 tons per year. [Paragraphs 60 to 61]

(x) The attainment of the estimated production at SCOB will entail a number of changes at both IISCO (The Indian Iron and Steel Company) and SCOB, as compared with the situation in 1950. These are:-

(a) Operational integration of IISCO's Hirapur works and SCOB's steel works to the extent that Hirapur should be operated primarily as an auxiliary of SCOB and all of Hirapur's iron should be of suitable quality for SCOB.

[Paragraph 43]

(b) The higher supervisory staff at SCOB should be sufficiently strengthened.

[Paragraph 46]

- (c) There should be provision for supplementary fuel supply for the open hearth furnaces. [Paragraph 47]
- (d) The loss in production time at the steel melting shop due to repairs and rebuilding should be reduced to about 20 per cent. [Paragraph 48]
- (e) The blown metal process should be adopted as one single standard method. [Paragraph 49]
- (f) Arrangements should be made for operating the two vessels at the Bessemer plant alternately. [Paragraph 50]
- (g) The blown metal should be charged to the open hearth furnaces in units of 50 tons composed of two 25-ton blows. [Paragraph 51]

(xi) In estimating future works costs of steel for SCOB, all inter-company charges above actual costs required to be paid by SCOB to IISCO under the IISCO-SCOB Agreement have been excluded from works costs. These charges have, however, been taken into account in establishing SCOB's overheads. [Paragraph 53]

(xii) In determining overhead charges for the two companies, we have more or less followed the same principles as had been adopted in our previous Report, except in regard to depreciation. In the case of the Tata Company we have provided a net amount of Rs. 300 lakhs for depreciation which is about Rs. 100 lakhs above the amount which would be allowed under the Income-tax Rules. The object of this provision is to enable the Tata Company to carry out all replacements and improvements which are considered to be essential for maintaining the Company's plant facilities at the optimum level and for stabilizing production at about 780,000 tons per year. [Paragraph 63]

(xiii) If Government accepts our recommendation regarding extra depreciation, the Tata Company should set aside a net amount of Rs. 300 lakhs for depreciation. [Paragraph 63]

(xiv) The extra amount of depreciation provided by us for the Tata Company should not be taken into account for purposes of determining profit-sharing bonus under the scheme now in force. [Paragraph 63]

(xv) As regards the provision of depreciation for SCOB, we have allowed a net amount of Rs. 54.48 lakhs, which is approximately Rs. 14.48 lakhs above the amount which would be allowed under the Income-tax Rules, in order to provide for small improvements and balancing of plant so as to ensure that production can be maintained at the level we have fixed. [Paragraph 63]

(xvi) If our recommendation in respect of extra depreciation for SCOB is accepted by Government, the Company should set apart a net amount of Rs. 54.48 lakhs for depreciation. [Paragraph 63]

(xvii) Retention prices of steel for the period from 1951-52 to 1953-54 should be fixed on a uniform basis, as shown in Statement No. V. [Paragraphs 75 to 76]

(xviii) In our cost estimates, we have taken the price of spelter at Rs. 3,500 per ton. The companies should be compensated out of the Equalization Fund for extra expenditure on account of any increase in the price of spelter above Rs. 3,500 per ton, which they may have to incur in obtaining supplies of the article. Conversely, if the price of spelter falls below Rs. 3,500 per ton, the difference on this account should be refunded by the companies to the Equalization Fund. For the purpose of necessary adjustments on this account, the average consumption of spelter should be taken at 175 lbs. per ton of ordinary grades of galvanized sheets and at 200 lbs. per ton for special grades of galvanized sheets. [Paragraph 77]

(xix) In case of a sustained decrease in the price of spelter below Rs. 3,500 per ton, Government may consider a reduction in the retention price of galvanized sheets for the benefit of the consumers. [Paragraph 77]

(xx) If significant increases take place in future in the prices of purchased raw materials and stores (except spelter), freight rates and/or compulsory charges under any labour welfare schemes initiated by the State, Government should examine the position and, if necessary, revise the retention prices. [Paragraph 77]

(xxi) The payment for defectives and cuttings should be made to the companies on the basis of the actual production of such defectives and cuttings, as categorized by the Board. [Paragraph 79(a)]

(xxii) The Railway Board should explore the possibility of supplying the special types of wagons as required by the steel companies. [Paragraph 79(b)]

(xxiii) A small Expert Committee should be appointed to carry out a study of the costs of manufacturing special grades of steel and, based on the recommendations of such a Committee, new schedules of extra charges for special products of the Indian steel industry should be established. [Paragraph 79(c)]

81. We have much pleasure to acknowledge the ready and willing co-operation we have received from the Tata Iron and Steel Company, the Indian Iron and Steel Company and the Steel Corporation of Bengal, who took the trouble to answer the exhaustive technical questionnaire issued by the Technical Adviser and furnish valuable memoranda to us and give oral evidence.

We are also thankful to Shri C.R. Natesan, Deputy Secretary, Ministry of Commerce and Industry, and Shri M.K. Powvala, Iron and Steel Controller, Government of India, for their advice on a number of issues that arose in connection with the inquiry.

Mr. Peter V. Martin of Koppers Company Inc. of Pittsburgh, Pennsylvania, U.S.A., who was engaged by the Government of India specially to work as Technical Adviser to the Board, has been a source of great strength to us throughout the inquiry. His intimate and extensive knowledge of the working of the iron and steel industry

in the U.S.A., both in its technical and managerial aspects, his familiarity with the conditions and problems of the indigenous steel industry derived from his active participation in the Koppers' investigations in connection with Government plans for expansion of steel production in the country, his strong conviction that India's resources and facilities for the production of steel are superior to those of most steel-producing countries of the world, his balanced judgment and his untiring energy have been of inestimable value to us. He prepared an instructive and illuminating report dealing with the technical and managerial factors that affect the costs of production at the two major steel works, and we have derived most valuable guidance from his report as well as from the many discussions we had with him. We are indeed greatly indebted to him and also to the Koppers Company Inc. for making his services available to us.

We should also like to express our appreciation of the efficiency with which Shri N. Krishnan, the Cost Accounts Officer attached to the Board, has carried out the cost investigations at the two steel works. The task was arduous and complicated, but he has done it in a thorough and systematic manner and has shown good understanding and sound judgment in tackling certain serious intricacies in analysing the costs.



H.L. DEY,
President.

B.V. NARAYANASWAMY,
Member.

M.A. MULIKY,
Secretary.

Bombay,
30th May, 1951.

APPENDIX I.

List of persons who were examined by the Board.

DATE	NAMES OF THE REPRESENTATIVES
	(a) The Tata Iron & Steel Co. Ltd.
9th April, 1951.	(1) Shri Jehangir Ghandy.
	(2) " A. Rajagopalan.
10th April, 1951.	(1) Dr. John Matthai.
	(2) Shri J.D. Choksi.
	(3) " Jehangir Ghandy.
	(4) " A. Rajagopalan.
	(b) The Steel Corporation of Bengal, Ltd.
13th April, 1951.	(1) Shri I.S. Puri.
14th April, 1951.	(2) Mr. S.W. Willet.
16th April, 1951.	(3) Shri R.N. Kapur.
	(4) " T.N. Hor.
	(5) " C. Griffiths.
17th April, 1951.	(1) " Biren Mookerjee.
	(c) Government Representative
18th April, 1951.	
	Government of India, Ministry of Commerce and Industry, New Delhi.
	(2) Shri M.K. Powvala, Iron & Steel Controller, Government of India, Calcutta.

